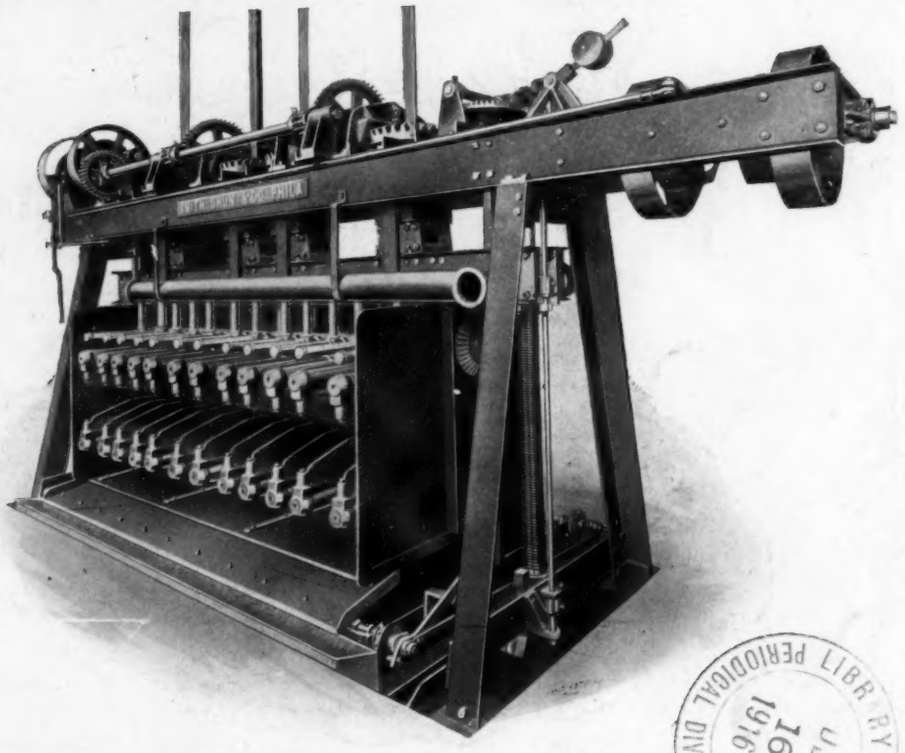
COTTON

Volume LXXXI
Number Two
Ten Cents a Copy

DECEMBER, 1916

Published Monthly by
W. R. C. Smith Publishing Co.
Dalton, and Atlanta, Ga.

MERCERIZING MACHINES FOR SKEINS AND WARPS



Our latest type of Skein Mercerizing Machine

Our Skein Machine has been in use for many years by the best concerns. It surpasses all others in production, quality of work and economy of operation.

Write for Catalog No. 3

SMITH, DRUM & CO.

"BUILDERS OF THE BEST"

Mercerizing Dyeing Singeing and Finishing Machinery

Southern Agent
H. G. Mayer, Charlotte, N. C.

Allegheny Ave., below 5th St.
PHILADELPHIA, PA.

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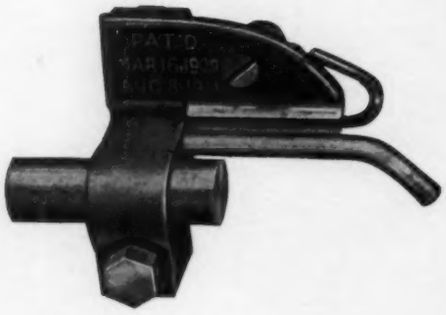

Over 140000

MacColl Patent Spooler Guides

in use up to
November 1 1916
Adapted to both
Cotton and Worsted Yarns

DRAPER CORPORATION

HOPEDALE MASSACHUSETTS

J. D. CLOUDMAN Southern Agent
188 South Forsyth Street Atlanta Georgia

Copyright 1916 by Draper Company

THE HIGHER THE WAGES

AND

THE SCARCER OR

MORE INEXPERIENCED THE WEAVERS

THE GREATER

ARE

THE PROPORTIONAL ADVANTAGES

OF

NORTHROP AUTOMATIC LOOMS

TRADE-MARK REGISTERED

DRAPER CORPORATION

HOPEDALE MASSACHUSETTS

J. D. CLOUDMAN Southern Agent
188 So. Forsyth St. ATLANTA GEORGIA

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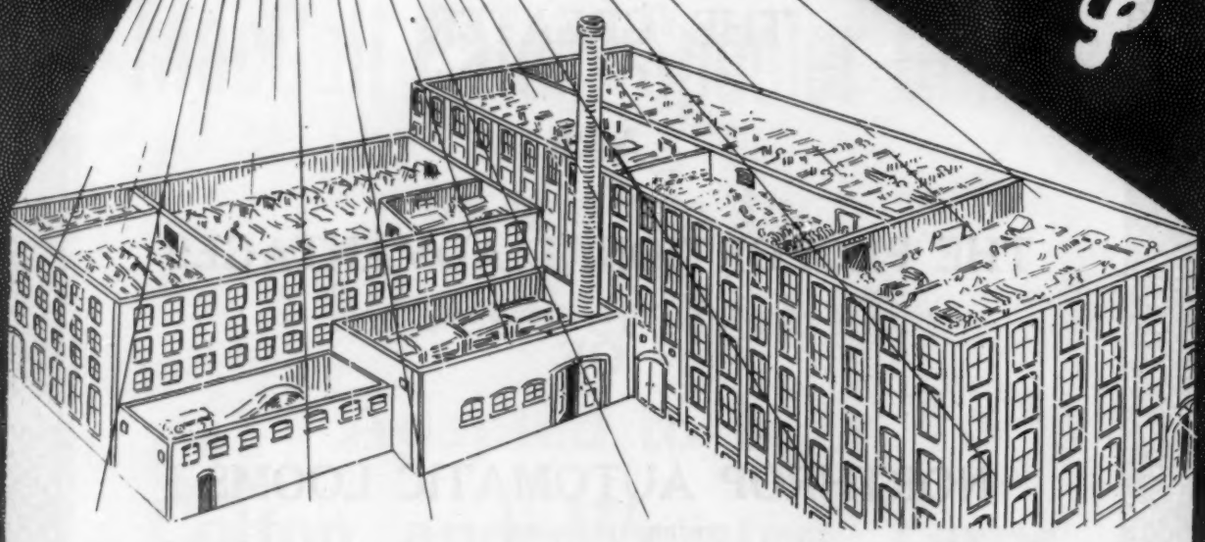
LET "DIXIELITE" YOUR MILL



WE'RE not going to tell you the advantages of white walls and ceilings in your mill—you already know that is a necessity to secure the maximum light and cleanliness, and make for the utmost efficiency among your operatives.

Your choice of a mill white depends upon your certainty beyond a doubt that it's all that is claimed for it—that it has the stay-there quality—that it will remain white with age without cracking or peeling.

In offering you "Dixielite" we haven't imitated anyone—WE HAVE PERFECTED a mill white that has behind it a guarantee of entire satisfaction.

You may have to pay a little more for it, but if you accept a cheap brand of mill white you would be only fooling yourself.

Your walls and ceilings coated with "Dixielite" will have a lasting, glossy snow white, light reflecting surface that can be secured with no other brand of mill white. Time doesn't change it. It won't yellow with age. It won't crack nor peel. It is washable and sanitary. Only one coat is needed.

Let us tell you all about "Dixielite." Ask us to send you full information today. A post card will bring it.

DIXIELITE
ONE COAT ENAMEL
The Perfect Mill White

Wadsworth, Howland & Co.
Incorporated
139-141 Federal St., Boston, Mass.
Makers of Bay State Brick and Cement Coating

A New Service for Textile Mills from the Makers of

THE HALL TRUCK
2-3½-5 TON

Timken Axles

Continental Motor

Are you up in the air on the transportation problem? Are you undecided as to what your haulage costs really ought to be—and whether or not you can lower them?

A Transportation Engineer Working With Textile Mills Exclusively

In order to assist Textile Mill owners who are making an effort to solve their haulage difficulties the manufacturers of the "Hall" truck now place at your disposal a thoroughly trained Transportation Engineer.

This man—seasoned by years of experience in the Textile field—will travel constantly among the various mills—spending his entire time co-operating with executives who are after efficiency in the moving of material and supplies.

W ll You Accept this Co-operation?

Will you take advantage of this opportunity to bring into your own situation the outside viewpoint of a recognized expert without the least obligation or expense?

While the object in retaining such a man is the ultimate increase of the "Hall" business in the Textile field, his time will be freely available to any mill—and his recommendations will be absolutely without prejudice.

For complete information, address

The Lewis Hall Iron Works **Detroit, Mich., U. S. A.**

More Than A Saving in Power

An absolute saving of 30 to 40 per cent of your Spinning Power is **only one** of the advantages of using the

Chapman Ball-Bearing Spindle

In addition to cutting down your power cost, you will get a more uniform yarn—a stronger yarn—run with lighter belts,—and save ends down.

And you can drive Chapman Ball-Bearing Spindles at 15,000, 20,000 or 25,000 revolutions per minute—tests have thoroughly demonstrated that the Chapman Spindle will run at considerably higher speeds than are possible on your spinning frames.

Without any obligation upon your part, we'd like to talk it over with you.

Chapman Manufacturing Company

185 Devonshire St. **Boston, Mass.**

85-3

There's No Better Proof

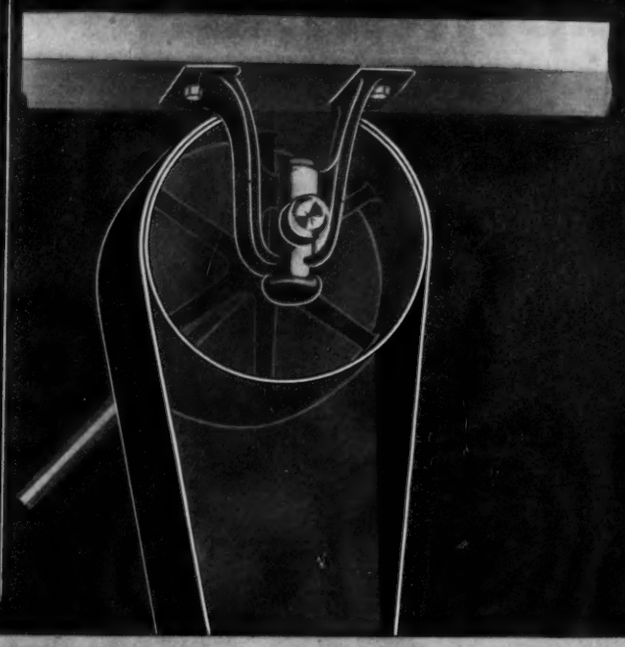
of the worth of Spartan Belting than the work it is doing on difficult quarter-turn drives.

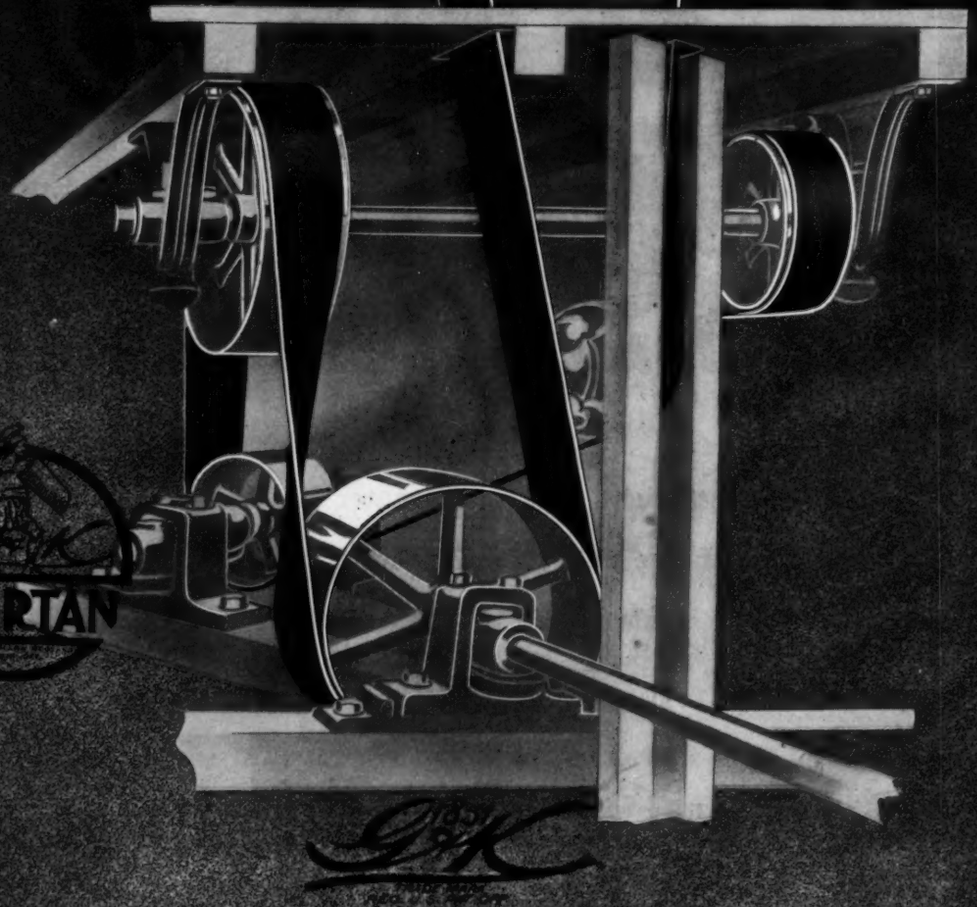
The pliability of Spartan

Leather enables the belting to operate successfully on short centers and to hug the pulleys tightly when taking sharp turns over small, high-speed pulleys, thereby insuring maximum power from the hardest quarter-turn drives.

The quarter-turn shown

herewith was designed by our own engineers, and to insure highest efficiency it was, of course, Spartan-equipt. These engineers are at your service too.





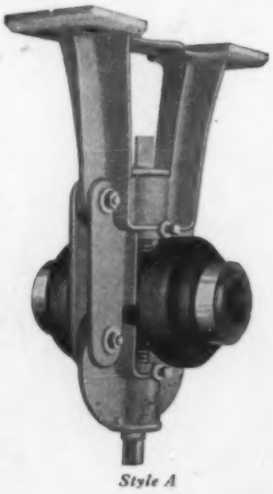
G & K

THE GRATON & KNIGHT MFG. CO.

WORCESTER MASS., U.S.A.

OAK LEATHER TANNERS AND BELT MAKERS

Chapman Ball Bearings

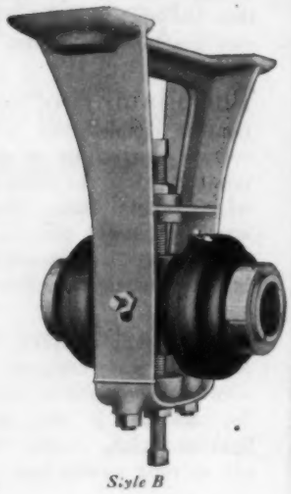


Style A

Designed for Shafting

will fit any standard hanger frame, and are interchangeable with self oiling boxes of the same shaft size.

You can obtain more uniform product and eliminate oil-spoiled goods at a decreased cost for power by using



Style B

Save 75% Friction

Reduce 95% Lubrication

CHAPMAN BALL BEARINGS

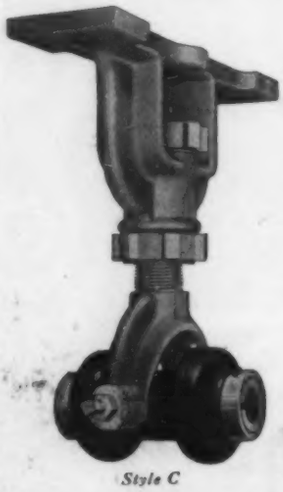
for

Shafting — Counter Shafting

Loose Pulleys — Friction Clutches

Mule Stands — Guide Pulleys

Power Tables, etc.



Style C

Style D

BRANCH OFFICES

New York
Room 101,
No. 30 Church St.

Philadelphia
Bourse Building

TRANSMISSION BALL BEARING CO., Inc.

32 Wells Street — Buffalo, N. Y.

Chapman Double Ball Bearing Co., Ltd., 339-351 Sorauren Ave., Toronto, Ont.

CHOOSE A DRIVE IN YOUR COTTON MILL

and make us prove that

Pinnacle Rubber Belt

Will save you 40c on the dollar

Does the increased cost of leather worry you? Here's our proposition—a real, practical solution:

We claim—and *know*—that Pinnacle Rubber Belt operates every bit as well as leather on 80% of Cotton Mill Drives; that therefore it will save you, in original cost, 40c on the dollar over leather belt cost.

But we want to prove it in *your own* mill. Pick out a drive—main, counter shaft, opener, breaker, card, spooler, warper, slasher, or heavy loom—any one where frequent shifting is *not* necessary. Equip the drive with "Pinnacle" Rubber Belt and "see"—keep the record—that "Pinnacle" operates just as well and long as a leather belt.

Remember—we do not recommend Pinnacle for drives with automatic shifters and the like. But on the others, isn't 40c on every dollar worth saving?

Isn't it worth one trial at least?

The B. F. Goodrich Company

Makers of the Celebrated Goodrich Automobile Tires—*"Best in the Long Run"*—and Everything That's Best in Rubber Goods

Branches Everywhere **Factories: Akron, Ohio**

2/3 Cotton

PREPAREDNESS

"CONDITIONS affecting industry are undergoing great changes. Competitive and market conditions are being altered, tariffs are being revised, new machinery and processes are being invented, the national and state governments are taking an active interest in industrial conditions."

"The foresighted business man realizes that it is incumbent upon him to provide and equip for a flexible operation of his business that will most efficiently meet changing conditions. **Purchased power accommodates itself with equal efficiency to either a program of retrenchment or of expansion.** It relieves you for all time of a power problem, and enables you to devote your entire energies to the manufacture and marketing of your product."

ARE YOU PREPARED?
IF NOT ADDRESS:

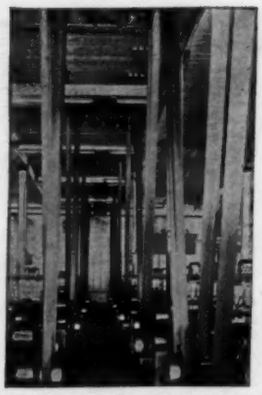
SALES DEPT.,

Central Georgia Power Co.

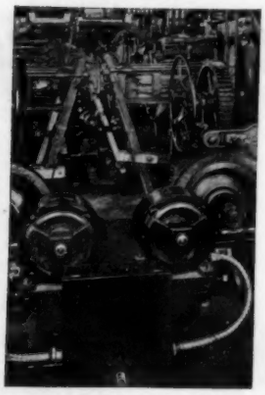
Macon, Ga.

Power Available in:

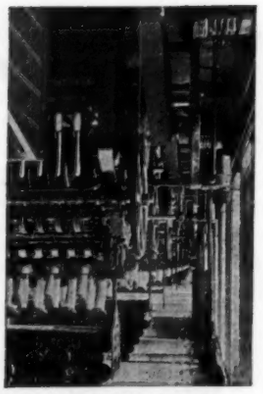
Macon	**Griffin**	**Jackson**
Forsyth	**Thomaston**	**Jonesboro**
Barnesville	**Hampton**	**Monticello**



Row of Westinghouse Type CS four frame drive spinning motors at Flint Manufacturing Co. Gastonia, N. C.



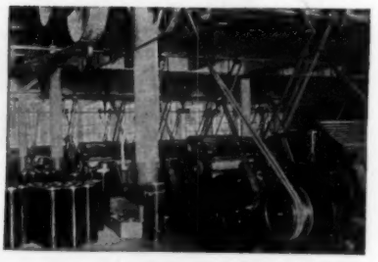
Westinghouse Loom Motors driving worsted looms, Princeton Worsted Mills, Trenton, N. J.



Worsted spinning frames, individually driven by Westinghouse Type CS motors, Uxbridge Worsted Co., Woonsocket, R. I.

Westinghouse Loom Motors driving webbing looms, Hope Webbing Company, Pawtucket, R. I.

Westinghouse Type CS Motor driving Pickers Revolution Cotton Mills, Greensboro, N. C.



Westinghouse Type CS motor driving group of cards, Naumkeag Steam Cotton Company, Salem, Mass.

W

WESTINGHOUSE ELECTRIC

Westinghouse Motor Drive for Textile Mills

If your mill drives have not kept up with the demand for increased production it will pay you to investigate Westinghouse Motor Drives.

Westinghouse Service is based on 15 years experience in the design, building and testing of electrical equipment for textile mills.

Westinghouse Electric & Mfg. Co.
East Pittsburgh, Pa.

Westinghouse

Type "H" Ball-Bearing Motors

For Cotton Mills

Efficient *electrically* and *mechanically*, Ball-bearings practically eliminate friction.

Clean because there is no oil to drip or throw from bearings.

Economical because upkeep is low—lubrication is necessary only once in three to six months.

Note these features of the Type "H" Motor

Feet cast solid with frame—No joints.

Solid metal rotor winding—without joints.

Fairbanks, Morse & Co.

Atlanta Baltimore New York

(1490—9W)

Allis-Chalmers

Textile Motors

Rugged in Construction
Reliable in Operation

They meet every requirement For Group or Individual Drive

Allis-Chalmers Manufacturing Co.

Milwaukee, Wisconsin

Offices in All Principal Cities

Canadian Representatives:
Canadian Allis-Chalmers, Ltd., Toronto, Ont.

The Heart of an
ECONOMY
renewable cartridge
FUSE

is the "Drop Out" Renewal Link. It is the only thing you have to replace in order to renew a blown ECONOMY FUSE. The expense is trifling, compared to the utter extravagance of discarding an entire fuse after it has operated.

Use Economy Fuses in your plant and by their use cut yearly fuse maintenance bills a full 80 per cent.

Write for free Samples. Test them. Let the results speak for the economy and safety of Economy Fuses. Be sure to ask for Catalog 39.

Economy Fuse & Mfg. Co.
Kinzie and Orleans Sts.,
CHICAGO.
At Leading Jobbers.

The Difference

The Slasher Man Must Have Good Light

The correct illumination of the slashers is essential. Here, as in other processes of the textile mill, the best results cannot be secured without plenty of light of the right kind.

A poorly lighted slasher room makes efficient sizing almost impossible. The warp must be seen plainly to enable the operator to detect broken or tangled yarn.

The operator may be able and accurate, but if the light over the slashers is poor, he cannot be expected to always obtain the correct, even thickness of sizing and see that the warp is properly dried.

If you will investigate this carefully you will find that with a good light it is possible to obtain mueh greater production, a better grade of product, and a smaller loss of material through defects and breakages.

A scientifically arranged installation of Westinghouse Mazda Lamps would be a mighty profitable investment for you. Our engineers have studied textile mill lighting and their services are at your disposal without obligation on your part.

We can help you. Write us today.

Westinghouse Lamp Company

Atlanta	Denver	Pittsburgh
Baltimore	Detroit	Portland
Boston	Kansas City	St. Louis
Chicago	Los Angeles	Salt Lake City
Cincinnati	Milwaukee	San Francisco
Cleveland	New Orleans	Seattle
*Dallas	New York	Syracuse
	Philadelphia	

Export Sales Dept., 165 Broadway, N. Y. C.
For Canada—Canadian Westinghouse Co., Ltd., Hamilton, Ont.
2412

Guaranteed by the Name

WESTINGHOUSE MAZDA

The Lamp for Industrial Lighting

KEEP OUT

Those "Keep Out" signs on your wooden fences mean nothing to the man whom you most wish to keep out.

The only way to make such signs effective is to make them unnecessary—make trespassing impossible. Equip your grounds with the silent guardian of steel

STEWART FACTORY FENCE

It makes a beautiful surrounding for your factory, leaves your grounds open to public view, yet forms an impregnable barrier against trespassing.

Stewart Factory Fence is permanent protection for your plant. It is made in various styles and heights. You pay no more for Stewart Fence than you do for ordinary iron fence. Let us tell you why you should select Stewart Fence.

Write today for full information.

The Stewart Iron Works Co.

525 Stewart Block, CINCINNATI, O.

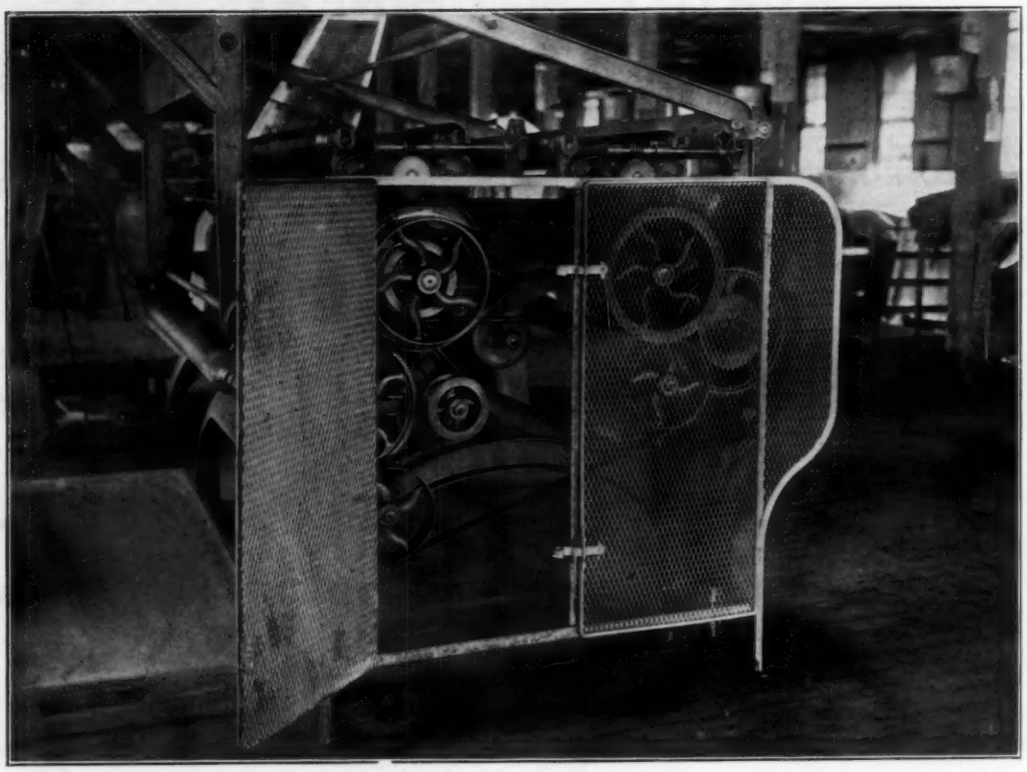
Better Results From Your Equipment

YOU may have been doing your work week after week in the same way, believing that you were getting the best possible results. But this is a mighty swift age and new methods of doing things are being invented day after day—methods which help you get better results from your boiler, your engine, your entire equipment.

These are methods you should know about—they are always advertised and in such a way that it's a rare advertising page that will not yield one good suggestion to you.

Suppose you read the advertising pages of this issue thoroughly and see how many methods suggest themselves to you by which you could make a much better showing, by which you could save time and expense —then act.

Steelcrete



All Moving Parts of Machinery Should Be Guarded With

"Steelcrete" Safety Guards

They make a permanent and sure protection from accidents. "Steelcrete" Safety Guards are made from integral sheets of diamond meshes and a simple framework of small angles or strips of iron. The size of the openings in the mesh may vary from ½" to 2".

The Consolidated Expanded Metal Companies

Braddock, Pa.

Southern Office:

Hurt Building, Atlanta, Ga.

Please send me your "Safety First!" Handbook, free of charge.

Mr. .....

Firm .....

Address .....

C

Steelcrete TRADE MARK REGISTERED

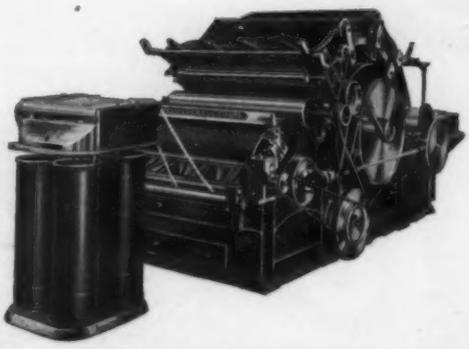
SACO-LOWELL SHOPS

TEXTILE MACHINERY

INCLUDING

SPECIAL EQUIPMENT FOR THE MANUFACTURE OF WASTE INTO YARNS & CLOTH

IMPROVED METHODS
AND
MACHINERY
FOR
HANDLING
COTTON WASTE
SIMPLE EFFICIENT



Four Coiler Waste Finisher Card.

DOUBLE CARDING
WITH
LAP-WINDER
AND
FOUR COILER
FINISHER CARDS
COMPLETE SYSTEMS

SHOPS

BIDDEFORD, ME. LOWELL, MASS. NEWTON UPPER FALLS, MASS

EXECUTIVE OFFICES

BOSTON, MASS.

ROGERS W. DAVIS, Southern Agent, CHARLOTTE, N. C.

CROMPTON & KNOWLES LOOM WORKS

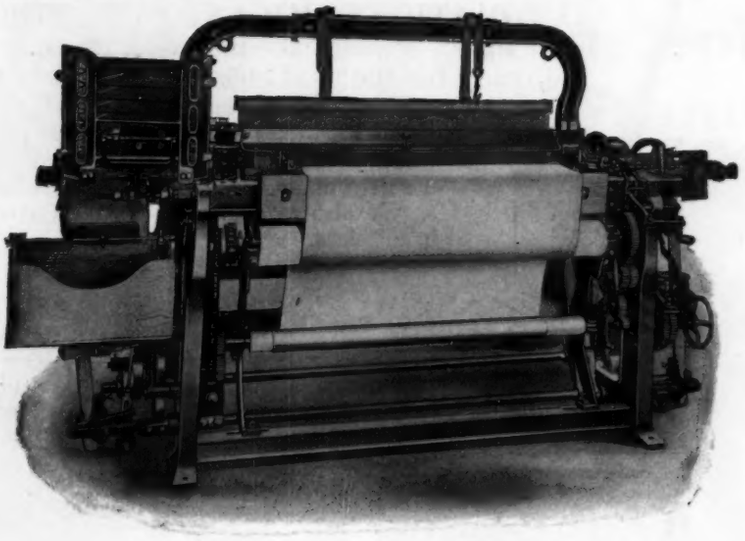
LOOMS

WORCESTER, MASS.

PROVIDENCE, R. I. PHILADELPHIA, PA.

Alexander & Garsed, Charlotte, N. C., Southern Representatives.

Reduce Weaving Costs 50 to 60%



1915 Model Plain Goods Loom

A Few Points of Superiority

Incontestable superiority in quality and fabrics.

Wide scope and ease with which these looms can be changed from one class of fabric to another.

Either cop or bobbin filling can be used interchangeably.

Freedom from excessive breakage and repairs.

No special supplies, bobbins or shuttles required.

Weavers run from 20 to 30 looms.

And remember that while saving 50 to 60% in weaving costs for you the—

Weavers Can Earn 40 to 50% More Wages

"IDEAL"

The Stafford Company

Readville, Mass.

Fred H. White, Southern Agent, Charlotte, N. C.

"IDEAL"

CLOTH CUTTING MACHINES

For Straight Edge Work, inked Samples, etc. Cut all kinds of Fabrics.

ONE STROKE OF THE LEVER OPERATES THE AUTOMATIC CLAMP AND CUTS THE GOODS, and the lever lifted, releases the material, leaving the knife guarded and ready for the next cut.

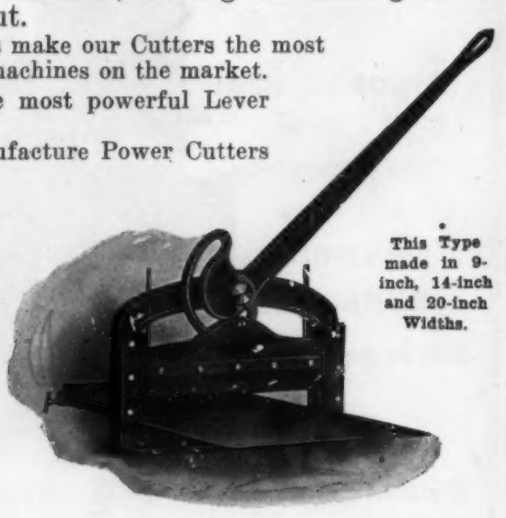
These features make our Cutters the most rapid working machines on the market.

These are the most powerful Lever Cutters made.

We also manufacture Power Cutters in all sizes.

This Type made in 25-inch and 32-inch Widths.

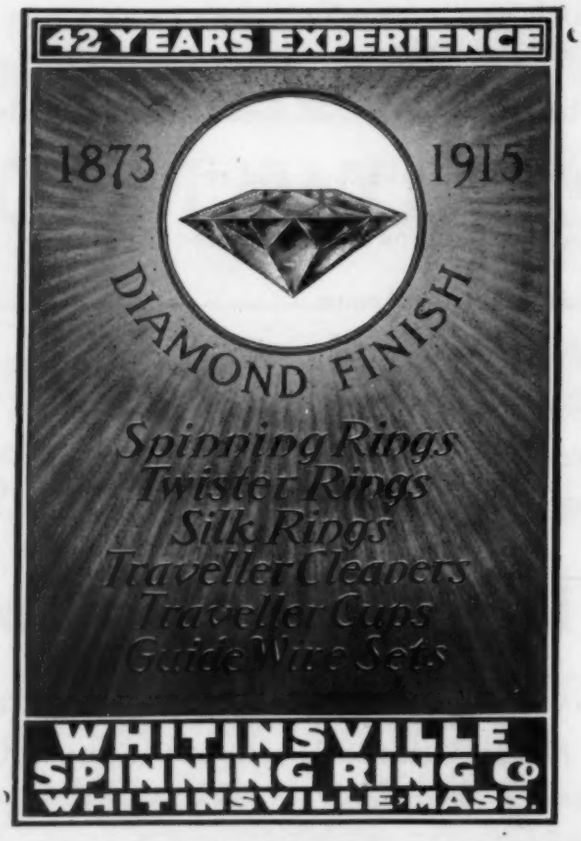
Circulars Upon Request



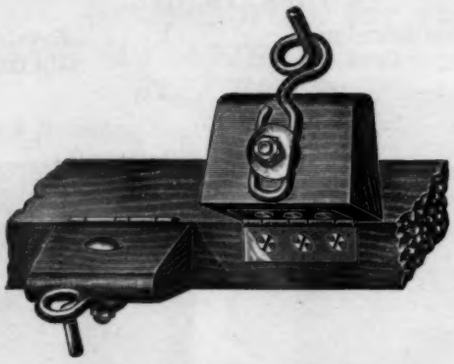
This Type made in 9-inch, 14-inch and 20-inch Widths.

The Smith & Winchester Mfg. Co.,
South Windham, Conn.

H. Hinze, Sales Agent, 116 Nassau St., New York.



The Palmer Adjustable Thread Guide



For Ring Spinning and Twisting Frames

Easily adjusted.

Extreme accuracy and permanence of setting.

Cheapest of them all.

Mail guide-block for free sample.

Patented and manufactured by

THE I. E. PALMER COMPANY

Middletown, - - - Connecticut,

Woolen Cards

Waste Cards

Ring Spinning Frames

System: G. Josephy's Erben

Asbestos and Flax Machinery a Specialty

Write for prices and particulars direct to the manufacturers.

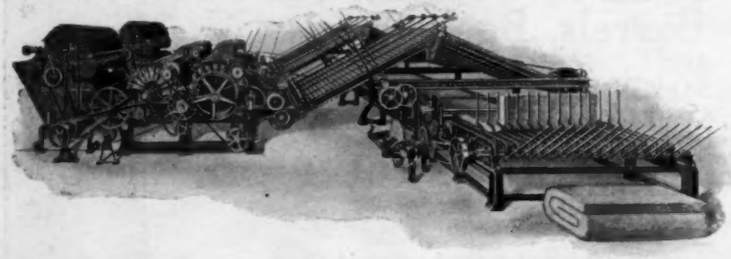
Lehnert Textile Machinery Company

53 State Street

BOSTON, MASS.

SMITH & FURBUSH MACHINE CO., Philadelphia

Specialists in machinery for working all kinds of waste products. Machinery for coarse waste yarns, mop yarns, rope; for shoddies, for wiping waste; for re-woven jute bagging, etc.

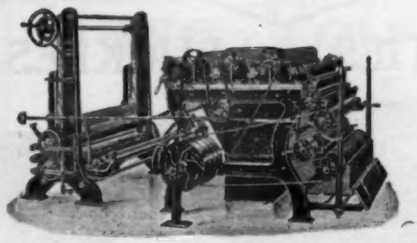


FELTING OUTFIT

for making batts or felts for mattresses or comfortables.

We build complete outfits of machinery for all kinds of felts.

Send for Catalogue S--15



COTTON BRUSHING MACHINE
With Calender Rolling Machine

Cloth Room Machinery

For all varieties of cotton fabrics

Machines for Inspecting, Trimming, Sewing, Brushing, Shearing, Singeing, Measuring, Folding, Doubling, Rolling, Winding, Trade-marking, etc., etc.

Curtis & Marble Machine Co.

WORCESTER, MASS.

Also successors to Joseph J. Schofield, of Providence, R. I.

Hercules
TRADE-MARK REGISTERED

Warehouse Cars

Improved construction throughout. Extra heavy "Hercules" vulcanized fibre. Steel covered top moulding. Self-oiling wheels.

No. 100.

With or without hinged cover.
Catalog No. 19, describing complete line of "Hercules" receptacles, sent on request.

Fibre Specialty Mfg. Co.
Kennett Square, - Pa.

KEYSTONE FIBRE CO.

YORKLYN, DEL.

Peerless Seamless Roving Cans.

Keystone Gill Cans.

FIBRE RECEPTACLES
for
COTTON, WOOL, SILK AND JUTE MILLS
Write for Catalogue D.

Leatheroid
MILL RECEPTACLES

Roving Cans, Trucks Doffing Cars, Mill Boxes Barrels, Baskets, Etc.

SOLD BY THE LEADING SUPPLY HOUSES OF THE SOUTH

LEATHEROID SALES CO.

1024 Filbert St., Philadelphia, Pa.

Selling Agents for the Leatheroid Co.

Schofield Patent Automatic Opener and Duster.

For opening and dusting Wool, Cotton, Linters, Hair and kindred fibrous substances.

"Schofield" intermediate feeds for Cards, Wool, Rag, Waste, Hair and Lumper Pickers, Automatic, Cone and Oldham Willows, Rag and Extract Dusters, Waste Pullers, Blamaine Lap Feeds, Curled Hair Pickers, Needle Looms, etc.

WILLIAM SCHOFIELD COMPANY

Iron Founders, Textile Machinery Builders.

Krams Ave., Manayunk, Philadelphia, Pa.

ACME

BALE TIES and BUCKLES

Painted Galvanized Bright No.4 Acme U Buckle.

Mfrs. of Steel Box Strapping and Steel Door Mats

ACME STEEL GOODS CO., Mfrs.

WORKS: CHICAGO, ILL. Stocks carried in New York City and Atlanta, Ga

Necessaries for the Mill and Shipping Department.

CARY'S EVERLASTING FLEXIBLE STEEL MAT

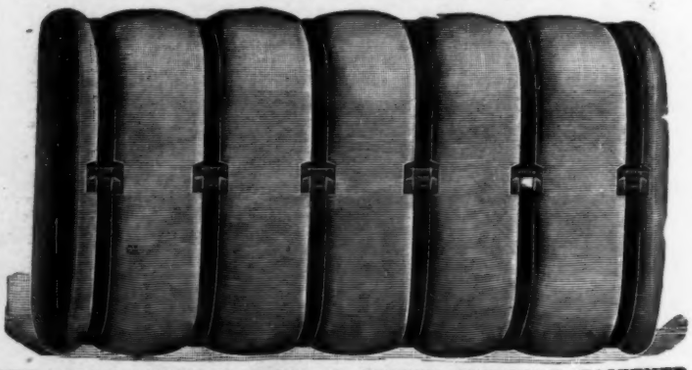
Has a Scraping Surface in Every Direction
Practically Indestructible.

The U. S. Government has contracted for this Mat to be used in all its buildings throughout the U. S.

TWELVE REGULAR STOCK SIZES.
SPECIAL SIZES TO ORDER

CARY'S BALE BAND AND BUCKLE

THOSE WHO HAVE TRIED THEM SAY THEY ARE THE BEST



THE ABOVE SHOWS A BALE OF COTTON SECURELY FASTENED BY OUR BALE TIES AND BUCKLES
NOTE ITS NEAT AND COMPACT APPEARANCE

The Buckle can be applied with the Locking or Hook part next to the Bale, so that there is no possibility of its getting caught in other Bales when piled together.

Also Manufacturers of

TWISTED AND FLAT WIRE BOX STRAPS and a FULL LINE OF SHIPPERS' SPECIALTIES.

Cary Manufacturing Company,

Manhattan Bridge Plaza
BROOKLYN, N. Y.

Our new Self-Tightening Twisted Wire Strap. Nails can be driven anywhere.

"STANDARD"
MILL EQUIPMENT

Superior Products
That Last Longer

"STANDARD" COMBINATION DOFFING CARS

"STANDARD" TAPERED FIBRE BASKETS

ROVING CANS—TRUCKS—BARRELS
DOFFING CARS—BASKETS—BOXES

Write today for catalog.

STANDARD FIBRE COMPANY

Miller Street, Somerville, Mass.

Have You Figured Out the Saving

Satisfaction and Convenience of using

"Sonoco" Spiral-Wound Straw Board Tubes

for winding your cloth—particularly
if it is to be shipped to the bleachers?

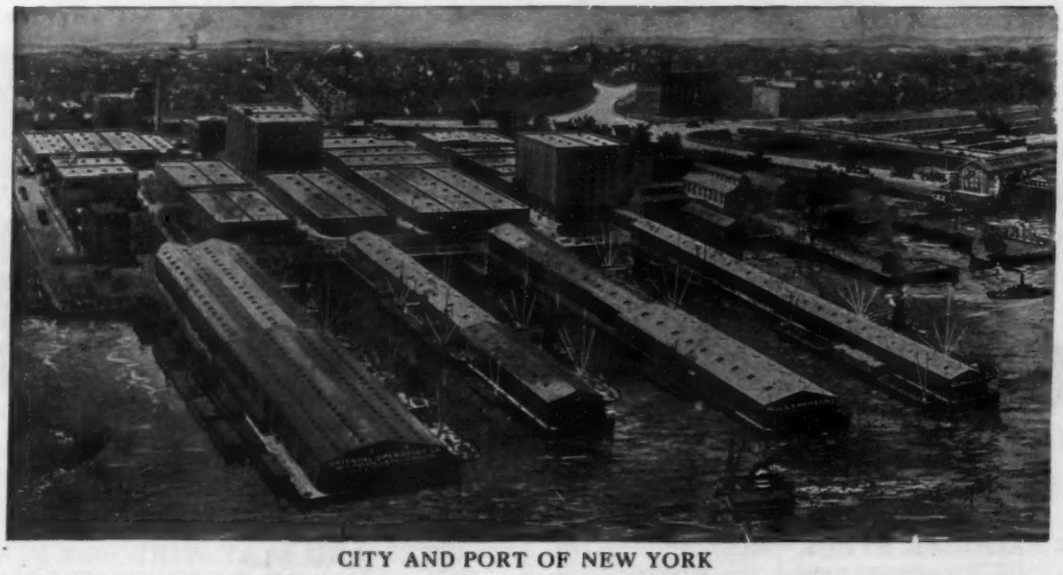
Send us your specifications and we shall be pleased to quote:

Southern Novelty Co., - Hartsville, S. C.

COTTON STORAGE

350,000 — BALES

HANDLED DURING SEASON OF 1915-16 AT AMERICAN DOCK TERMINAL



CITY AND PORT OF NEW YORK

Lowest insurance and storage rates in the City and Port of New York obtained in modern concrete warehouses. Fully protected by Automatic Sprinklers. New York Cotton Exchange license. Bonded employees. Forty years' experience in Cotton Storage Business. Direct rail connection with all Trunk Lines. Illustrated booklet and rates on application to

AMERICAN DOCK COMPANY

Executive Office: 17 State Street, New York

"If you are not a patron of the American Dock Terminal, you should b[illegible]."

What About Your Mill Office?

Is your office just a plain "cotton factory" office with worn-out furniture and inefficient filing systems, etc.?

Or is it a modern "Textile Mill" office, with up-to-date office furniture and "easy of access" filing systems—an office that has a brisk, business-like look to it?

Let us make your office up-to-date. We carry everything for the mill office,—desks, chairs, tables, Globe-Wernicke filing cabinets,—everything that is used in an office.

Our prices are right—our service is prompt.

Baylis Office Equipment Company

ATLANTA, GA.

Bradley Stencil Machine

The BRADLEY STENCIL MACHINE
Makes Stencils in half a minute, at reduced cost of 1-10c each
Write for catalogue and price list.
In universal use by thousands of manufacturers and shippers.
A. J. BRADLEY
Gen. Sales Agent
101 Beekman Street, New York, U.S.A.

Bradley Ball Stencil Pot uses Liquid Ink for marking and stenciling. Price 30c or $3.00 per doz. Manufacturers of Oil Stencil Papers.

Write for Prices and Samples.

A. J. BRADLEY MFG. CO.,

99 Beekman Street, NEW YORK

Don't **WRITE** the same wording over and over again—

Use a Rubber Stamp

Your order will be filled

Promptly and Properly.

DIXIE SEAL & STAMP CO.

ATLANTA, GA.

STENCILS | METAL CHECKS

Ask us to show you how

NATIONAL COUNTING MACHINES

are saving money on counting in the Hosiery Mills. Also how they are doing the counting in well known mills manufacturing handkerchiefs, cottons, threads, silks, underwear, garters and a long line of other textile products. These mills are now saving money on their counting. Perhaps you can do the same Isn't it worth investigating at any rate?

Catalog On Request.

NATIONAL ELEVATING ROLLER BEARING CHAPMAN TRUCKS

LABOR IS SCARCE---WAGES ARE HIGH---WHY NOT LESSEN THE LABOR and LOWER THE COST OF TRUCKING?

YOU can do it by adopting the National-Chapman system of trucking, whereby loads are transported on cheap wooden platforms—the truck itself being always free—always working—never delayed to wait for unloading.

The National-Chapman Elevating Truck for textiles, with platforms, costs less to install than the number of old-fashioned trucks necessary to accomplish the same amount of work. In operation, it saves from one to three men's labor—a considerable amount when figured in dollars at the end of the year.

Isn't it worth while to know about the National-Chapman Elevating Truck for textiles—to consider it as a possible money-saver in your business? Ask for complete information and Illustrated Catalog C.

NATIONAL SCALE COMPANY

12 Bank Street Chicopee Falls, Mass.

All Trucks Equipped with Hyatt Roller Bearings

Established 1875

P. GOLDSMITH'S SONS

Manufacturers

Base Ball Supplies—Sporting Goods
Base Ball Uniforms—Athletic Clothing

John, Findlay & Charlotte Sts.

Cincinnati, Ohio, Dec. 23, 1913.

O. J. Root Co.,
Bristol, Conn.
Gentlemen:—

As time goes on, we are finding more and varied uses for your Bristol and Elm City counters, as we have absolute confidence in their INFALLIBILITY. We have counters are receiving every day use in our plant, and while the quantity we are using is not so great, the duty which each of these counters perform is enormous compared to the amount of time and LABOR which would be required to go thru the same operation and give the same results.

We would kindly ask you to ship us at once, by express, your Bristol Counter No. 4 which counts to 10,000, having four figures.

Your prompt attention will be greatly appreciated by us. Mark this for the Base Ball Department. We intend to use this counter in our Base Ball Department for heavy work, and will transfer one of your Elm City counters to our Clothing Department where the work is somewhat lighter. Yours very truly,

P. Goldsmith's Sons,
Per Emil B. Goldsmith.

"The Duty These Counters Perform is Enormous."

Here's a letter of large saving possibilities for you—read it. How could it be more convincing or more clearly show the possibilities of checking output mechanically? You know how hard it is for men to stand hour in and hour out, counting. Mistakes are bound to occur. You suffer. Of course **you** make textiles but it is just as important to keep an **accurate** account of your output as it is to check base balls.

You can always receive the **right** count, down to a single piece by equipping your machines with

ROOT COUNTERS

By stopping the leak on bad counts, these counters pay their way from the day you buy them—mean a permanent satisfaction and saving for years to come.

They have no springs or small delicate working parts to give trouble, add expense, and tie up production. You **never need see** a Root Counter except to record its totals.

FREE FOR 30 DAYS: Write **today for your** counter. Prove its merit under your own requirements. This incurs no obligation or expense. Write.

C. J. ROOT COMPANY

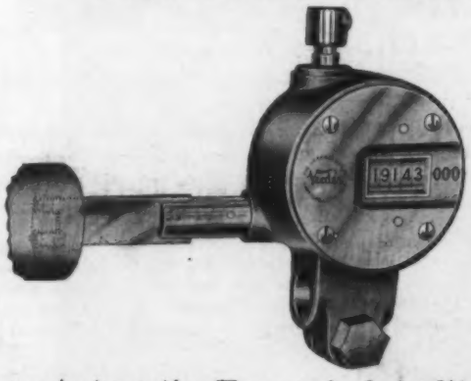
200 Johnson Street

BRISTOL, CONN.

Veeder Textile Counters

are enabling manufacturers to cut costs, tell where the leaks are and give the exact performance of all the machines and operators.

Loom Pick Counter



Veeder

PRODUCTS
LITTLE THINGS THAT COUNT

Speed Counter

For taking the speed of Mule, Ring Frame or Throstle and Roving Spindles.

are Automatic, Economical Auditors that tell the truth and never throw up their jobs. Our Free Booklet has shown many textile manufacturers how to count their costs and cut them. We will send it to you with pleasure upon request.

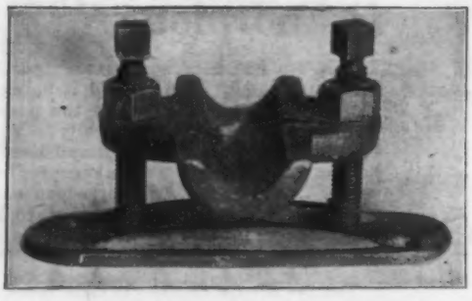
THE VEEDER MANUFACTURING CO.

Speed Counters
Lineal Measuring Counters

6 Sargeant St., HARTFORD, CONN., U. S. A.
MAKERS OF
Cyclometers for Bicycles and Motorcycles, Odometers for Automobiles and Horse Drawn Vehicles, Tachometers, Tachodometers.
and Fine Die Castings.

Hank Counters
Thread Measuring Counters

DAY Adjustable Rocker Shaft Bearings



No. 1 A. Patented Oct. 26, 1915.

THIS is just a common sense attachment that has not failed to satisfy a single mill.

Your rocker-shaft troubles will be over when you equip your looms with Day Adjustable Bearings. They will save you the cost of a new rocker shaft for all time, reduce seconds and thin places, save in supplies, break-outs, and in many other ways.

As one Georgia mill superintendent wrote us,

"Any practical mill man who will test these bearings, will find at least twenty different ways in which they will keep the loom in better shape and increase production. I would advise any mill man to try these bearings and be convinced of the merit of it, like I have been."

This man equipped his 1820 looms with Day Adjustable Bearings.

Any of the many mills using them will tell you about their many advantages.

Let us send you a pair for trial. State kind of loom. Write today.

Textile Specialty Company

(Formerly Day Adjustable Bearing Company)

GREENWOOD, S. C.

HUBBARD BALL BEARING BOXES

Hubbard Ball Bearing Boxes were first applied to shoddy pickers early in 1912, and today the original boxes are in constant service, proving the practicability of ball bearings for textile machinery.

Heavy main cylinders of Cotton, Woolen or Worsted Cards also offer an excellent opportunity for ball bearings to reduce friction and eliminate wear and care of the journals.

Hubbard Main Cylinder Card Box Disassembled Showing the S K F Ball Bearing.

For further information and prices write—

FRED H. WHITE,
Southern Agent,
Charlotte, N. C.

HUBBARD MACHINE CO.
Worcester,
Mass.

Steady Improvement For 20 Years

Twenty years ago, the first AMERICAN Steel Split Pulley was the best belt pulley on the market—because it was *steel*. In those 20 years it has proved that it wears longer, delivers more power and consumes less energy. because it fans a minimum amount of air as it revolves and allows only a minimum belt slip.

But the steel pulley that we make now differs from that of 20 years ago. With each year improvements were made—nothing radical—but *improvements* nevertheless.

Today the three million AMERICAN Steel Split Pulleys that have been marketed are the best evidence of unassailable pulley quality.

Addressing us direct, or communicating with the nearest AMERICAN Pulley dealer, will bring you pulley facts vital to your business.

AMERICAN
STEEL SPLIT PULLEY

Over 60,000 pulleys —3 in. to 120 in. in diameter — stocked at centers named below, and additional thousands stocked by over 200 dealers.

AMERICAN PULLEY CO.

4236-60 Wissahickon Ave. Philadelphia, U. S. A. New York—33-35 Greene St. Boston—165 Pearl St. Chicago—114-116 S. Clinton St. Seattle—534 First Ave., South.

This picture shows one of the many Kron Scales in use in the various mills of the American Thread Company.

Increased Weighing Efficiency Assured

The Kron performs automatically the whole weighing operation, weighing the material as fast as it can be handled. There's no chance for guessing—no false motions—no time wasted.

"Load and Look"

KronScales

AUTOMATIC SPRINGLESS

All Metal Construction

are proving a great time and labor saver in hundreds of textile mills and industrial plants of every description and are saving thousands of dollars yearly to the users.

You, too, can secure **100% efficiency in your weighing** by installing a Kron.

Write for catalog and complete information.

American Kron Scale Co.

422 East 53rd St., New York.

CHICAGO—58 East 11th Street
PHILADELPHIA—506 Franklin Bank Bldg.
CLEVELAND—610 Union Bldg.
PROVIDENCE—125 Washington St.
BOSTON—141 Milk Street.
PITTSBURGH—Business Men's Exchange
LOUISVILLE—405 Urban Bldg.
SAN FRANCISCO—156 Fourth St.
WILSON, N. C.—Opposite Chamber of Commerce

"I Would Not Be Without Them

Should They Cost Double the Money"

SO SAYS S. S. Miller, hosiery manufacturer, Reading, Pa., writing about his experience with Link-Belt Silent Chain in driving the machinery in his hosiery mill. Before installing Silent Chain Drives every known power transmission was considered, and "quite a few of them tried."

Link-Belt Silent Chain Drives solve the power transmission problems of the modern textile mill. They afford positive drives on long and short centers, and are over 98% efficient.

It will be worth your while to investigate Link-Belt Silent Chain Drives for your work. A single drive will convince you that it is the ideal transmission for power.

Write for Data Book No. 125, our 112-page price list. It explains Silent Chain Drives, and shows how to select them and to determine prices.

LINK-BELT COMPANY

PHILADELPHIA CHICAGO INDIANAPOLIS

New York .....299 Broadway
Boston.....49 Federal St.
Pittsburgh.....1501 Park Bldg.
St. Louis....Central Nat'l Bank Bldg.
Buffalo.....698 Ellicott Square
Cleveland.....1304 Rockefeller Bldg.
Detroit.....732 Dime Bank Bldg.
Wilkes-Barre.....2nd Nat'l Bank Bldg.
Minneapolis.....413 S. Third St.
Louisville Ky...F. Wehle, Starks Bldg.
Seattle.....580 First Ave., S.
Portland, Ore.....14th & Lovejoy Sts.
Los Angeles, 161 N. Los Angeles St.
Denver, Lindrooth, Shubart & Co., Boston Bldg.
San Francisco.....461 Market Street
New Orleans, Whitney Supply Co., 418 So. Peters St.
Knoxville.....Empire Bldg.
Birmingham, D. T. Blakey, 309 Am. Trust Bldg.
Charlotte, N. C., J. S. Cothran, Commercial Bank Bldg.
Toronto, Canadian Link-Belt Co., Ltd.

For Efficiency and Economy

Use NIGRUM Bearings

You'll never have to stop your machine, due to the neglect of someone to properly oil it, providing you use NIGRUM Bearings.

NIGRUM Bearings run smoothly and evenly without oil, grease or attention. They will save you money by saving you oil, and eliminate much of the wear and tear upon the working parts of the machine.

Write for Interesting Booklet, "Oil-less Bearings."

BOUND BROOK OIL-LESS BEARING CO.

10 Church St., BOUND BROOK, N. J.

All Genuine Graphited "Oil-less Bearings" have always been made at Bound Brook, N. J., in the United States of America.

That Is Where You Lose Power

Whenever or Wherever Your Belt Slips You Are Losing Power.

You don't need to paint your belts with any sticky substance to make them run properly. Crown your pulleys with scrap leather, or even common cotton cloth placed in layers until you gain the desired effect.

AMENT'S IRON GLUE

will hold almost any substance to any surface for any reasonable length of time.

☛Send for Free Sample Today.

H. B. AMENT

8 Camp St., Louisville, Ky

Here's the Story in Six Parts

of the efforts of the Blackstone Mfg. Co., Blackstone, Mass. to make their spinning frames run properly.

I	II	III	IV	V
CUT GEARS Wore out quickly Also too noisy	STEEL GEARS Noisier Lasted little longer than I	RAWHIDE AND FIBRE GEARS Quieter—but did not last long	CHAIN DRIVE No better than III	CLOTH PINION against Cut Gear 2½" Face. Expensive and lasted one year

PART VI—→

One year was the longest time any of the gears or chains lasted. The belt drives with Cork Insert Pulleys on motors and machines have been running without trouble of any sort since 1912 and today are in as good working order as ever. The superintendent, Mr. F. M. Bills, will give you any desired details. This is just one of many hundred cases covering all lines of manufacturing where Cork Inserts get results hat were impossible with ordinary equipment. They meet all conditions—heavy loads, high speeds, small arc of contact, dampness, dust, oil—they are he one type of pulley that guarantees the delivery of all the power the belt will corry—1 H. P. or 1000 H. P. it makes no difference.

Send for catalog *showing the different uses and economies of Cork Insert Pulleys and how others have cashed in on them by stopping the wastes.*

THE CORK INSERT CO., 162 Federal St., Boston, Mass.

THE COUPLING SYSTEM OF ROPE DRIVING

This coupling is for use on the English system rope drive and controls all stretch of the individual ropes in this system.

Hunt Coupling ready for use.

You can shorten these ropes at any time by simply twisting the coupling. This is done with the rope in position on the pulleys.

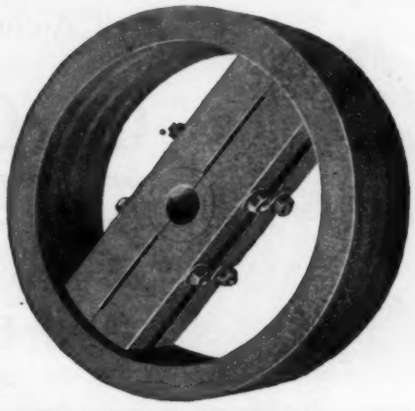
If you are considering the installation of a rope drive or are now operating such a drive let us show you the advantages of the Hunt Coupling System.

Ask us for Catalogue W-15-1 treating generally of rope driving and describing our coupling system.

C. W. HUNT CO., Inc.,

WEST NEW BRIGHTON, N. Y., U. S. A.

61 Broadway, N. Y. City. Fisher Bldg., Chicago. Munsey Bldg., Washington.



The Excelsior Wood Split Pulley Company wishes to

ANNOUNCE

To the supply trade that their Company was completely reorganized about April 1 of this year and now has NEW OFFICERS, NEW DIRECTORS, NEW CAPITAL and is under entirely new management.

We have installed new machinery, new power and greatly increased our production.

It will be our aim in the future to make one of the best wood pulleys on the market, and we will carry a large, complete stock at all times.

Dealers write for catalogs and discounts. We want one in your town. Write us.

EXCELSIOR PULLEY CO., Inc., CUBA, N. Y.

M. A. Howell, Pres. & Gen'l. Mgr.

E. Z. Howell, V. Pres. & Treas. C. F. Zietlow, Secy.

Machine Tools—Mill Supplies
and
Foundry Equipment

We represent the following companies:

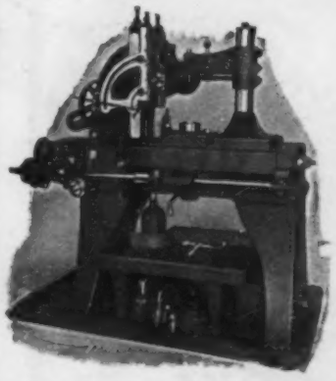
Whiting Foundry Equipment Co.
Landis Bolt Cutters
Gould & Eberhardt Shapers and Gear Cutters
Lodge & Shipley Lathes
Cincinnati Bickford Upright and Radial Drills
Acme Turret Lathes
Blanchard Surface Grinders
South Bend Lathes
Skinner Lathes and Drill Chucks
Cincinnati Millers and Grinders
Cincinnati Planers and Boring Mills
Bullard Boring Mills and Vertical Turret Lathes
Cleveland Open Side Planers
Williams White Punches and Shears
Stoever Pipe Cutting Machines
Baker Bros. Drills and Keyseaters

High Class Line of
Belting
Hose
Packing
Pipe
Valves
Fittings
Elevating Machinery
Conveying Machinery
Power Transmission Machinery
Pumps
Air Compressors
Gas and Oil Engines

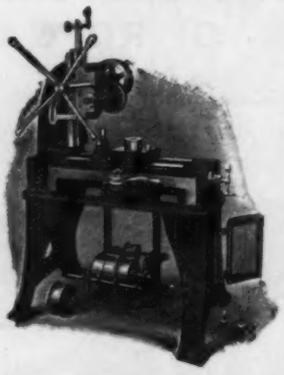
When in the market for apparatus manufactured by the above concerns, we guarantee you prompt service and absolute satisfaction. Let's get acquainted.

See list of stock on hand on page 184.

SEEGER-WALRAVEN CO.
28 West Alabama St., Atlanta, Ga.
Economy is Buying Wisely—Not Cheaply



Full Automatic, Semi-Automatic and Hand Operated
Gear Cutting Machines
Especially adapted for use in Cotton Mills. Hundreds now in use. Send for Special Circulars.
The D. E. Whiton Machine Co.,
NEW LONDON, CONN.



ANTI-CORROSIVE
CYLINDER OIL
TRY A BARREL FOR 60 DAYS
If it does not come up to your standard of what a good lubricating oil should be, and you consider that it is not worth our price—put your own value on it and remit on that basis. Isn't that a fair proposition? "A. C. C." will pare down your oil and cylinder repair bills—save your piston packing, too. It has been doing this for forty years, it will effect such a saving now—just give "A. C. C." a chance.
May we go into the subject with you?
ANTI-CORROSIVE CYLINDER OIL MANUFACTURED ONLY BY E. H. KELLOGG & CO. 243 SOUTH ST. NEW YORK
E. H. KELLOGG & CO.
243 SOUTH ST. NEW YORK

ANTI-FRICTION LUBRICANT
FLOTA MICA
TRADE MARK
Mix It With Your Oil
REDUCE OIL BILLS
Flota Mica is a scientifically prepared dry compound, that is mixed with oil, the oil being used simply to carry the compound to the bearing.
Flota Mica will absolutely reduce friction, cool any hot bearing, and fill up scored marks. It will not cake or harden, nor will it stop up the finest oil groove.
A much cheaper oil can be used when Flota Mica is mixed with it, thus you can cut your oil bill in half.
Sold on the basis that if not fully satisfactory, the unused portion may be returned at our expense and no charge for the quantity used.
Write today for booklet.
THE FLOTA MICA SALES COMPANY
214 Moffat Bldg. Detroit, Mich
AGENTS:—A. H. Carriers, Security Bldg., St. Louis, Mo.; V. A. ore, 1504 Healy Bldg., Atlanta, Ga. H. W. Nickel, 1265 Broadway, Room 411, New York City.

THE PROOF OF THE PUDDING

When such mills as these install and endorse B. W. welding apparatus, it means that they are convinced that welding when properly adapted, means an actual saving in time and money.

Mass. Mills In Ga.	Bibb Mfg. Co.
Proximity Mfg. Co.	Erlanger Cn Mills
Springstein Mills	Manchester Mills
Lancaster Mills	Lawrence-Holt Mills
Thomaston Cn Mills	Lanett Cotton Mills
Pell City Mills	Erwin Cotton Mills
West Point Mfg. Co.	Floyd Cotton Mills
Pelzer Mfg. Co.	Social Circle Cn Mills
Anchor Duck Mills	Covington Cn Mills
Shawmut Mills	Trion Cotton Mills

And over two hundred others..

A Demonstration is a Revelation.

BIRD-WILCOX CO., Inc.

Chattanooga, Tenn. Savannah, Ga. Atlanta, Ga.

HERE IS IRREFUTABLE PROOF

The three highest buildings in the world—Metropolitan Life Bldg., Woolworth Bldg., and Singer Bldg.—have installed

BLACKMAN VENTILATORS

Could any stronger proof of their superiority be given than selection by the most prominent Architects? Send for our catalog, giving names of hundreds of other prominent buildings equipped with Blackman Ventilators.

HOWARD & MORSE,
45 Fulton St., New York.

WEST POINT IRON WORKS

Cotton Mill Castings

LOOM AND SECTION BEAMS

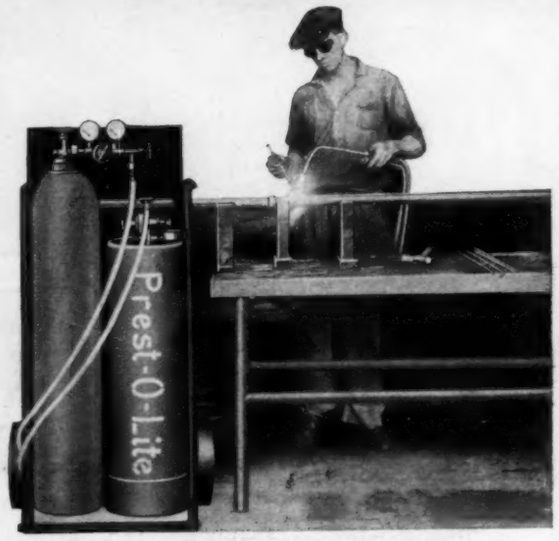
MANHOLE FRAMES AND COVERS

GRATE BARS

Write Us.

West Point, Ga.

Oxy-Acetylene Welding and Cutting



Broken Crank Shaft Made Good as New at Cost of 50c by Oxy-Acetylene Welding

A broken crank shaft in *your* mill would cost you much more than 50c, in time lost alone.

By having oxy-acetylene welding equipment on hand, you can make immediate repairs to broken or worn machine parts and tools right in your own shop, thereby avoiding expensive delays and replacements.

Oxy-acetylene welding has great possibilities for decided savings in every textile mill. It makes possible better repairs at less cost.

Prest-O-Lite PROCESS

Employs both gases (acetylene and oxygen) in portable cylinders. Prest-O-Lite Dissolved Acetylene (ready-made carbide gas) is backed by Prest-O-Lite Service, which provides dry, purified gas, insuring better welds, quicker work, and lower cost, and also avoids the large initial outlay and heavy depreciation incurred in making crude acetylene in a carbide generator.

Necessary equipment is not expensive. We furnish high-grade welding apparatus for $60 (Canada $75); acetylene service at additional cost. Adaptable for oxy-acetylene cutting by the addition of special cutting blow-pipe. Thorough instructions are furnished free to every user of Prest-O-Lite Dissolved Acetylene—any average workman who understands metals can learn the process quickly and easily.

If you are interested in developing extra profits in your mill—in repair or construction work—investigate oxy-acetylene welding. Fully illustrated literature sent on request.

The Prest-O-Lite Company, Inc.
The World's Largest Makers of Dissolved Acetylene
U. S. Main Office and Factory:
836 Speedway, Indianapolis, Ind.
Canadian Office and Factory, Merritton, Ontario.
53 Branches and Charging Plants

MAXIMUM EFFICIENCY FROM STEAM HEATED TEXTILE MACHINERY

SLUGGISH circulation in the steam coils of your heated machines is impossible if you install the

Morehead
Back to Boiler
SYSTEM

The saving and use of all hot returns as boiler feed is like "eating your cake and having it." The steam has done its appointed work, but has not yet given up all its initial heat. By returning the condensation direct, under pressure, to the boiler very little of this heat is wasted.

This is simple, common sense economy. Get all the facts—ask for catalog.

MOREHEAD MANUFACTURING CO., Cotton Mill Dept., DETROIT, MICHIGAN

TOWERS and TANKS
That are Built Right

Boilers,

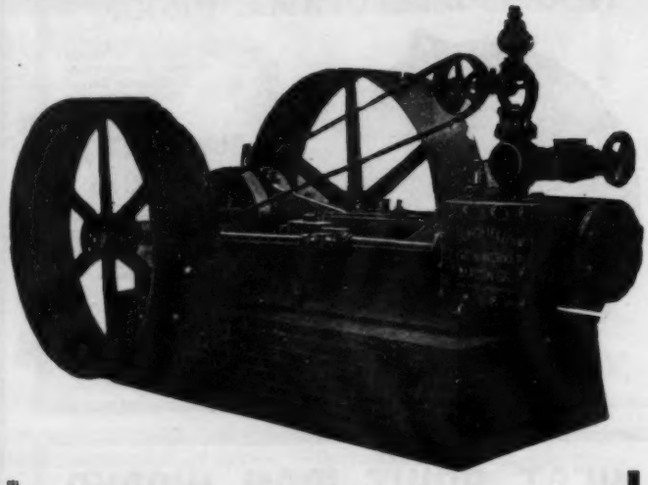
Structural Steel Work

Sheet Steel and Plate Work

Boiler Tubes, Castings, Etc.

Tell us what you want and let us quote prices.

The Walsh & Weidner Boiler Co.
Chattanooga, Tenn.



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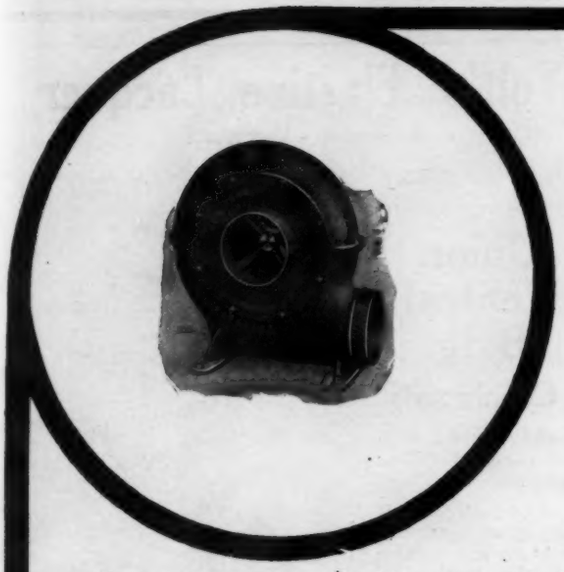

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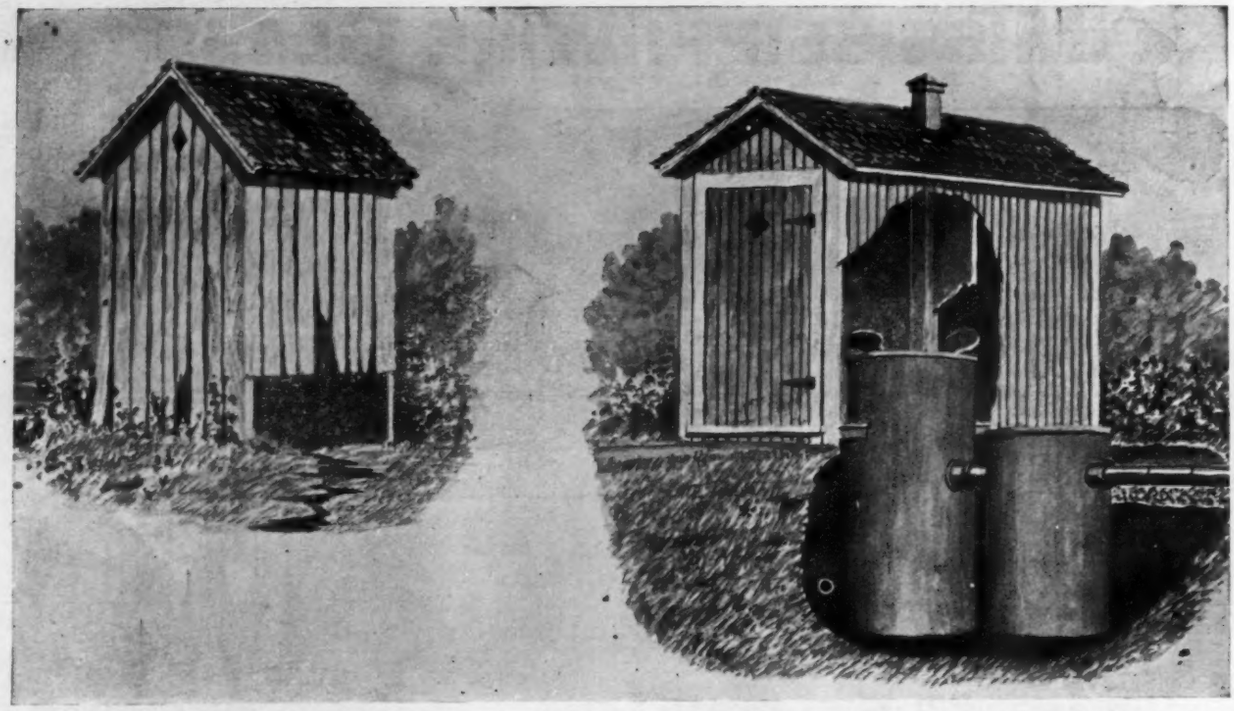

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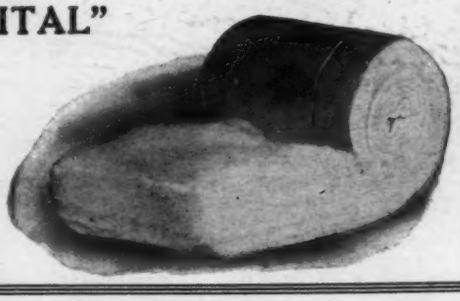

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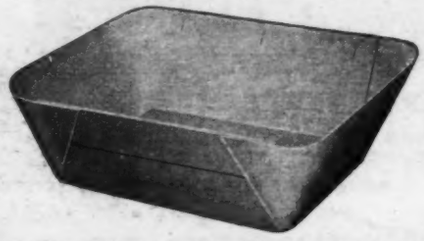

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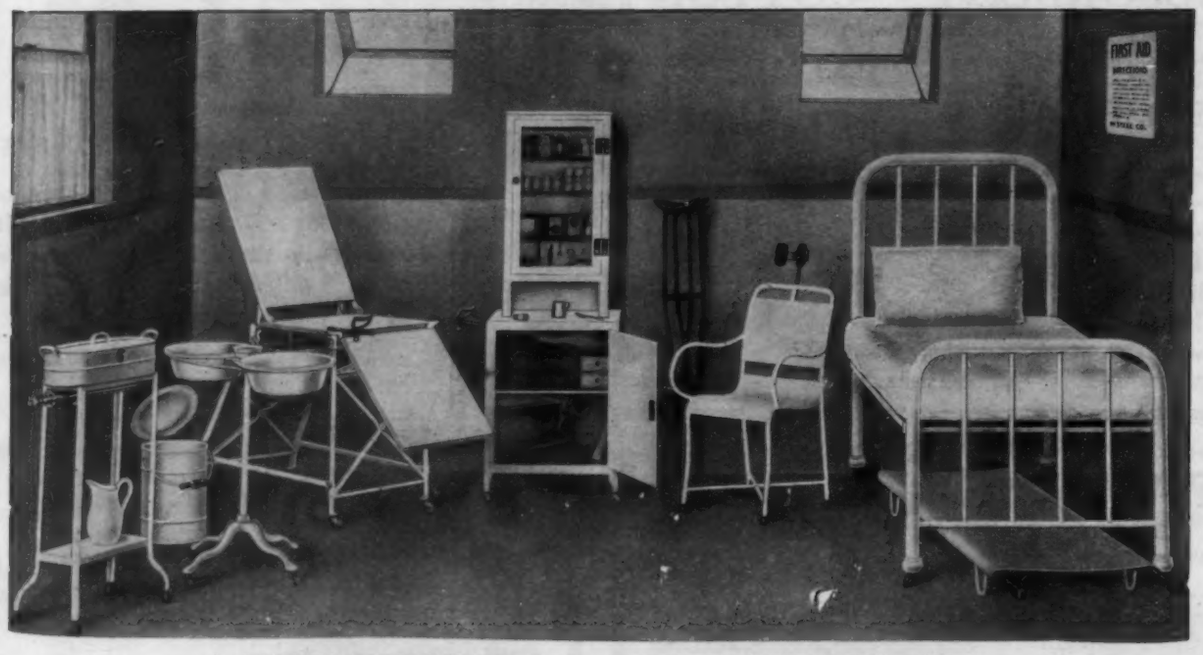

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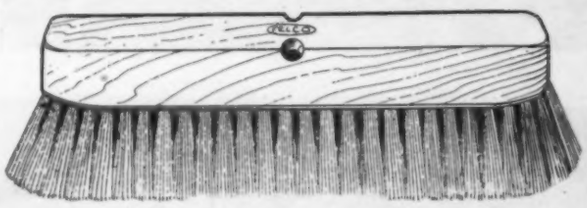

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L. L. ARNOLD, Editor.

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Orders for any change in advertising must reach Atlanta previous to the tenth of the month preceding month of issue, otherwise publishers cannot be responsible for changes.

When changing address, *notify us*, not the postmaster. Always give the old address as well as the new one.

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Volume 81. **Member Audit Bureau of Circulation.** **Number 2**

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A mill superintendent in South Carolina writes:

"Kindly put me in touch at once with either a second-hand Garnett machine, or the manufacturer of a machine for running clips and ravelings in a hosiery mill."

We want the readers of COTTON to know that the Editorial Department is always ready to help you in locating the manufacturer of any machinery or supplies you may desire to purchase. If they haven't the information at hand, they can readily secure it. If you don't find what you want to buy in the advertising pages, write the Editorial Department and the information will be sent you by return mail.

GRADDICK'S PRODUCTION TABLES.

From an officer of a six million dollar knitting corporation:

"I have followed with a great deal of interest the publication of the Graddick's Production Tables in COTTON and I would like very much to know if you are going to publish a production table for filling or hosiery yarn spinning to follow your table No. 2 and to carry yarn numbers up high, say to about 65 or 70. If, by chance, you have already published this and I have overlooked it, I would thank you to send me a copy of same. I would also like to have another copy of table No. 2.

DOESN'T FORGET COTTON.

One of the readers of COTTON writes us:

"I recently returned from a two years' stay in China and want to renew my subscription to COTTON."

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WHAT'S IN THIS ISSUE OF INTEREST TO YOU?

Not every article in each issue will be of direct interest to all readers of COTTON. Covering as COTTON does manufacturing problems in cotton, knitting, dyeing, bleaching and finishing mills, together with cotton and yarn market reports, there will necessarily be articles that do not have direct bearing upon your present work. However, if the editorial departments have done their work well, the number of articles in each field will be well balanced and you will find much of interest in your particular line. If you would like to see more material upon any one subject, if you have any particular questions you would like to see discussed, just jot them down and mail them to us.

DESIRES INFORMATION ON BUILDING A NEW COTTON MILL.

From the secretary of a Chamber of Commerce in Kansas:

"Please send us sample copies and terms of subscription of your publication COTTON. It is our purpose to organize a company here within the next few months for the purpose of building a cotton mill. Would be glad of any suggestions you may care to offer as to what you think of the field along this line of investment."

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A power and textile engineer in North Carolina writes—

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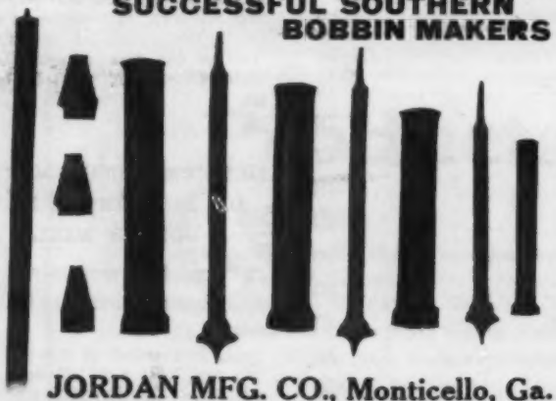

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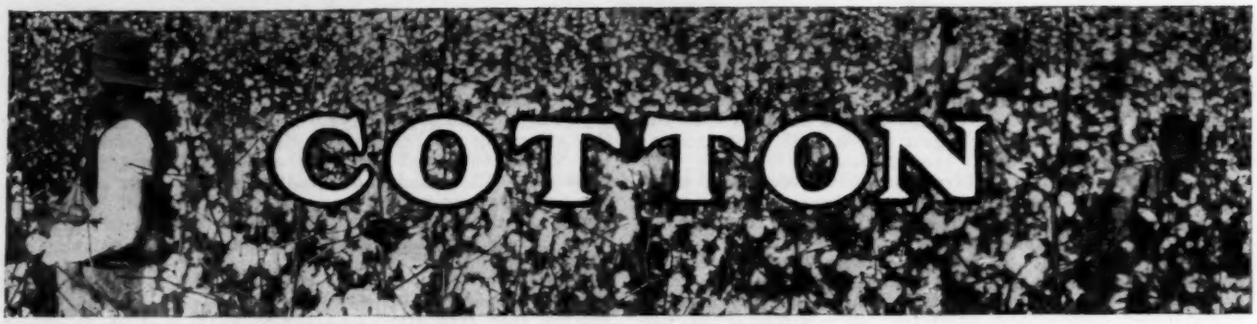


December, Nineteen-Sixteen.

How the South Should Move.

For the first time in a generation there are large amounts of fluid capital in the South. Whatever its people may wish to undertake, there is enough home money here to do, if there is sufficient courage and intelligence behind the money.

As a concrete example of this statement the two widely separated cities of Atlanta, Ga., and Tulsa, Okla., with a total population, not much if any over 225,000, have on deposit in their banks at this writing about 100 millions of dollars. This is but one illustration of the easy condition everywhere prevailing.

Certainly the time appears to have come for a decided forward movement, and there are three parallel roads which we should travel at a properly co-ordinated pace.

These three roads are Agriculture, Mining, and Manufactures stated in the order of relative priority of claim for recognition.

Commerce will take care of itself without special effort. In Transportation, aside from Texas, we need very little new railway trackage, though both railway and river transportation should be much improved.

Let us briefly consider our Agriculture. Our great defects have been too large an acreage for the power used, the adherence to one crop systems, and the lack of working capital. Let us take the last item first. In no other of the great agricultural nations is the farmer expected to operate without a working capital. In some countries this working capital runs to $50 per acre, and in countries like Belgium where garden farming is the rule, to $200, $300, $400 per acre. This defect can now be overcome, for while the Rural Credits Law is very crude it seems likely that its most beneficent effect will be to unloosen the purse strings of men of money who have heretofore looked askance at the farmer. There is now plenty of Southern money to finance Southern farmers at fair rates of interest.

The next drawback, the one crop system, has been so thoroughly discussed and its weaknesses shown, that it needs but a few words. We must diversify or be destroyed. That is the plain English of it. Corn, wheat, oats, forage crops, fruits, cattle and hogs, *must* be the supporting pillars of our cotton and tobacco and the statement needs no argument.

We come now to note that the acreage is too great for the power used, both man power and horse power. That means slovenly, hasty, and poor cultivation. That spells poor crops even in good seasons. We need more machinery and close cultivation. We need to double our acre production in every crop, and it can be done.

The greatest blessing that could come to the South would be that not an additional acre should be brought under plow in the next ten years. If that could be brought about our farmers would be truly prosperous. Every bank, every chamber of commerce, every board of trade should get in close and sympathetic touch with our farmers, in an effort to remedy the defects of our agriculture. We see today the results of a failure to intelligently co-ordinate our agricultural and industrial life.

Mining offers a tremendous opening to Southern men and money. No other equal area of the world's surface is richer in the minerals which lie beneath the surface. Coal and iron, copper and aluminum, salt and sulphur, oil, lead and zinc, marble and granite, slate and soapstone, kaolin and ochre, gold and quicksilver, graphite, mica and feldspar, all these and many other valuable mineral elements are found in quantities and the field has hardly been scratched over. This ought to attract men and money.

Manufacturing will necessarily follow these other developments. In cotton manufacturing we have done well and probably pushed forward as fast as was prudent, but there are many manufacturing opportunities yet to be seized and these will be seen as we move forward.

In so far as we have become a manufacturing people one just criticism can be leveled at our manufacturers which is that they have been less enterprising in pushing their wares than their Northern colleagues, and this should be remedied.

One field we have overdeveloped, Lumbering. Our timber has been ruthlessly wasted, and in that direction conservation of what is left should be the watchword.

In this brief outline nothing more has been attempted than to call attention to the fact that the South has abundant money, with ample fields for profitable use at home, and with no need to indulge in stock gambling or wasteful luxury.

Concerning Conventions.

The accompanying story about conventions is reproduced by permission from *Drill Chips*, a little magazine published by the Cleveland Twist Drill Company. It is printed as the text for a sermonette. It is rather long for a text, but the longer the text the shorter the sermon.

"It's a funny thing about conventions—since time immemorial mankind has been attending conventions and yet both mankind and conventions continue to survive. It is wholly inexplicable. Early in our youth we succumb to a wild craving for knowledge, which we are led to believe nothing but a particular convention can satisfy. So we attend that convention. We linger thereabouts for a pe 'od of time de-

pending upon our physical endurance, and return home disillusioned and imbued with a passionate desire to eschew all things conventional for ever and ever thereafter.

"Quite often we stick to this resolve for as long as a year—or until the next convention heaves its head over the horizon—whereupon we are again seized with that convention hunger, and we repeat the previous performance with only minor variations. Conventions have become a habit with most of us—like corset stays, teething rings and vice-presidents, they are a relic of a delicious past to which we cling in fond remembrance.

"Publicly we all detest conventions, but privately we have much sympathy for them. As a result someone is always perpetrating a convention. Prospectus after prospectus arrives—each with its insidious story. For a time we switch them to the wastebasket unopened, with a wholesome feeling of righteousness in the act. But at last the convention microbe gets into our feverish blood and we steal a guilty glance into one of these seductive folders which extols the benefits to be derived from the forthcoming conclave.

"'Alea jacta est'—same being highbrow for 'the die is cast.' We read that it will be a 'mental stimulus,' a 'business banquet,' a 'feast of facts,' a 'foregathering of brains' and a 'galaxy of glory.' It's the same old story—we have read it and heard it one thousand times one thousand, and yet we are hooked. That 'mental stimulus' stuff did the work—we need a 'mental stimulus,' yes our business needs a 'mental stimulus.' There will be bunches of big men hanging low where we can reach them at this convention. 'Big, business building thoughts' will be running around loose like dust on a windy day.

"Webster, in his well-known little novelette, calls a convention 'an assemblage meeting for a common purpose.' Evidently Brother Noah had attended a convention or two and knew whereof he spake, for the most common of all purposes is to get something for nothing. That is why we go to conventions—and then we don't get it. We slip away ostensibly to learn of the new things in the trade and (confidentially) to slip a wee bit of vacation past the eagle eye of a grasping firm. But we don't get the vacation, and all those new things are befogged by a pack of propaganda pushers who are there to sell us something which we don't want. And then they don't sell it. The day after a convention is a mutual disappointment to all concerned.

"Let it be known that we are disposing of no second-hand information here—one fleeting look at us will tell more plainly than words that we have just returned from one of these legalized joy rides. Like all its forerunners this particular convention was bill-boarded as a regular gold mine of ideas and a sure-enough touchstone to eternal fortune. It was all of that and a little bit more—for the hotels. Hotels seem to be the only people able to take something away from a convention which they do not bring to it. Judging from my own personal experience with hotels at convention time, this is not to be wondered at. For instance: On arrival at the forementioned convention, I made my way to a hotel which had been selected by our committee as an honest and upright emporium. They greeted me like a long lost brother, and as a token of esteem presented me with a sky-lighted hall bedroom that was undoubtedly a linen closet in less prosperous times. It cost five dollars per diem whether you slept in it or not. As an extra special inducement, I also had an interest in a bathtub next door. This proved very attractive until I discovered that the balance of the floor held a like interest. One chap in particular displayed a fondness for that tub which amounted to a real affinity. If cleanliness is really next to godliness, as they say, this man had a through ticket for the Pearly Gates—he slept in that tub because it was much more comfortable and convenient than his bed.

"Conventions are like rubber plants—you can't kill them, and the farther away you are from them the better they look. A convention in your own home town never amounts to very much. But if the same assemblage were to convene in Venice or Paris, it would, undoubtedly, be the 'biggest thing of its kind ever held in the history of the organization.'

"For that reason this convention, from which I am now recovering, was a real world-beater—I had to travel 458 miles to get there. Along with some 5,000 other deluded victims I made the trip filled with enthusiasm and hope. The lid was removed with much pomp and ceremony on a Monday morning by our beloved president, who undressed himself for 68 minutes upon the good which we were about to receive. The outlook, as he pictured it, was brilliant in the extreme and we all with one accord yanked out reams of paper and nice new pencils that we might the more readily dash off notes upon the scintillating ideas soon to be cast among us. I still have that pencil and the point is still as innocent of use as the day it left the factory. Each morning I took it out and held it poised and waiting for the lightning to strike. Each evening I sheathed it in its scabbard unsullied by exercise of any kind.

"For four long, hot days we of the Faithful stuck it out. Our attending numbers shrank visibly hour by hour, until on the fourth and final day only a few disheartened wrecks remained. These had undoubtedly stuck in their seats since the previous day rather than return to the hotel. Only the speakers' platform retained its customary vigor of lung and limb. From morning till night throughout the entire siege it was adorned with an untiring array of horn tooters whose favorate song seemed to be 'I'm the Guy.' After looking back over long years of convention oratory we are led to believe that this ditty may safely be termed the national convention anthem.

"Furthermore we have come to the unalterable conclusion that a convention can be a profitable investment for only three kinds of business—the band business, the bunting business, and the bunk business. Some there are to be sure who would add another 'B' to the list, but since a bottle has not touched our lips since our bawling babyhood, we cannot speak authoritatively on this point.

"It is possible (though we regard it as hardly probable) that someday there will be a convention at which we will do something besides march ourselves lame, talk ourselves hoarse and decide upon the date and place of the next eruption. But when that convention arrives we'll be garbed in little white kimonos and the Angel Gabriel will call us to order, for surely then the millennium will be here."

This is the viewpoint of a manufacturer on conventions in general. It is reproduced to illustrate a point. It shows a mental attitude that is more or less prevalent among higher executives. It is, however, particularly pertinent at this time because at the recent meeting of the Southern Textile Association in Columbia, a committee was appointed to approach the leading executives of the Southern mills and ask for greater financial support from the mills in order to further the work of the association.

The membership of this association is composed of superintendents and overseers—the men who stand between the mill officers and the operatives. They have to deal with three variable factors, machinery, cotton, and human nature, and their problems are many and complicated. They should therefore, be given all reasonable support and opportunity to get together in any research work tending to increase their efficiciency.

It has long been the custom of some members, after returning from a meeting, to report to their superiors any new points or methods they might have acquired while away, but this custom should be made more general. The discussion periods should be longer and the excellent suggestion made by a member at the Columbia meeting, that the subjects to be taken up on the program at the meeting six months hence be given out to the members at the previous meeting, to allow time for careful thought and study, should be adopted.

Because of the low membership rate, the finances of this association are always at a vanishing point. While it is only right and proper for the mills, as the greatest beneficiaries, to assist in a financial way, the foregoing "text" suggests an additional method that will aid in two directions.

If the Board of Governors would raise the price of associate membership to $10 per year, they would increase the association income around $1,000 per annum. If, at the same time, they would go on record with the statement that they preferred this method of cash support, and that individual members were not only able, but willing to pay for their own dinners and entertainment, such a stand would go a long way toward removing the "junket" idea from the minds of the mill officials to whom they expect to appeal for further financial aid.

Southern Textile Association

The semi-annual meeting of the Southern Textile Association, which was held at Columbia, S. C., on Friday and Saturday, November 17th and 18th, was attended by upward of 250 active and associate members.

Ideal weather conditions prevailed and the inhabitants of the South Carolina capital headed by the committee on arrangement and entertainment gave open house to those present, which resulted in a most enjoyable time. The majority of the membership stopped at the headquarters of the meeting, which were at the Jefferson Hotel, and much praise is due Mr. Cain, the popular proprietor of this hostelry for the manner in which he handled a crowd which was considerably too large for his equipment. This feeling of satisfaction was particularly evident when, as many of the guests were departing, members took occasion to personally thank Manager Cain for the splendid service rendered.

Early members began to arrive a day ahead of the convention proper, and by Thursday night probably one hundred were present and renewing old acquaintances.

At 11:00 A. M. Friday morning President Heymer presented a new gavel (made in Alabama) to Chairman W. P. Hamrick of the entertainment committee. Chairman Hamrick then called the meeting to order, and after extending a welcome on the part of the entertainment committee introduced the Reverend P. E. Burts, Pastor of the First Baptist Church, who offered prayer.

Chairman Hamrick then introduced Mayor L. A. Griffith, M. D., who addressed the association and welcomed them to the city of Columbia. He said he was glad to meet men who are working and striving to improve the industry in which they are engaged. He called attention to the excellent schools in the city and also to the up-to-date water works and sewage system and invited the visitors to visit all. "These stand for health" he said, "and I know that you mill men will agree with me when I say that the health of the city is the first fundamental to its well being."

Irving Southworth, Agent of the Hampton Mills Branch of the Pacific Mills, was to have delivered an address of welcome on behalf of the manufacturing interests, but owing to the presence of a number of officers and directors of his mills from Boston, who were in the city visiting the plants, he was prevented from being present. He sent his regrets and expressed the hope that the meeting be highly successful. After making this announcement Chairman Hamrick turned the gavel over to President Frank E. Heymer, who assumed the chair.

The next address on the program was the response to the address of welcome by John A. McFall, Superintendent of the Dilling Cotton Mills at Kings Mountain, N. C. After thanking Mayor Griffith and the others for their very cordial welcome to the city of Columbia, Mr. McFall continued:

"The organization you have as your guest today is not composed of men who have 'sailed through life on flowery beds of ease,' but those are they who, by pluck and perseverance, have obtained promotion and whose hands are stained with toil; men with high ideals and in whose breasts there burns the desire to help their fellow men to step to a higher plane of living and to obtain a more excellent degree of intelligence."

The next address on the program was the

President's Address.

by President Frank E. Heymer, of Alexander City, Ala. President Heymer spoke in part as follows:

During the last year, we have been brought face to face with a situation very few of us have experienced, and it placed many an overseer and superintendent in a position where he could show his ability and resourcefulness in meeting the demand for more operatives, due to the increased demand for cotton goods, which forced numerous mills to adopt a continuous system of operation. The splendid industrial condition of other sections and trades took quite a number of our operatives to other fields of labor, and such

PRESIDENT FRANK E. HEYMER.

places had to be filled again, also we must face another phase of the labor question very soon, that is, the National Child Labor Law which will go into effect next fall. This situation, I would suggest, should receive our most careful consideration, and should be freely discussed among the members, but preferably in open meetings.

I have given the question of child labor laws a great deal of thought, but have been unable to see any great advantage the child receives by being prevented from following its inclinations and ambition to lay the foundation for its future career at a time when a child is ambitious, and this is usually between the age of 14 and 16. Have you ever seen a healthy boy or girl at that age who did not desire to become somebody? The greatest monument our child labor leaders and agitators could erect for themselves and the future generation would be to use all their efforts for a National Compulsory Education Law, whereby a child can receive early training and be ready for the battle of life when through a school term of say, eight

years. Then we would have a more efficient class of operatives in all branches of industry and in my opinion, no child labor law would be necessary to impede the ambition of girls and boys at the proper age.

In most states there is no law to compel a child to go to school, but in Alabama we now have a law that requires any child, between the age of 14 and 16, to go to school eight weeks before they can be employed in any manufacturing establishment. It is a proven fact that children who have not attended school until they become of that age, are not in such a receptive mood to learn during the short school term required by such a law. At that age children turn their minds to other attractions and school work becomes a burden, not a success. The plea of our past president, Mr. Sherrard, in his last address on this subject, certainly should be given our careful attention. It is my strong conviction that no child labor law will ever accomplish the desired results, unless we have Compulsory Education in every state in the Union.

The unusual healthy business conditions, in the cotton industries for the past year, has brought up many new problems for each of us to contend with and I am looking for still further increased activities, at least for two more years. We must bear in mind, that the nations of Europe have a depleted stock, and it will take them at least a year or more to bring anything like order out of the chaos they are in at present. We should make the best of these opportunities and prepare for the time which will come when competition will again be keen with the continental manufacturers. If there ever was a time when American manufacturers had an unlimited opportunity to succeed, that time is now.

I note with pleasure the efforts of the National Association of Cotton Manufacturers, and the American Cotton Manufacturers' Association to enlarge their scope and become of more value to the trade by instituting an organized service of experts for research work on behalf of our industry. Such a movement is of exceptional value and we should all use our efforts along such lines.

Foundations and institutions have been organized in other American industries to enlarge and support research work for the advancement of their respective lines. The textile industry needs organized efforts to improve machinery, materials and further develop manufacturing processes and methods. A striking illustration of this can be cited in the dye stuff industry which recently suffered greatly by the European conflict. By cooperating with the large textile associations, we could accomplish great results, and we could, if necessary, ask the aid of the Government to assist in this work, similar to the aid given the Agricultural experiment and research institutions.

In conducting such experimental and research work we would not endeavor to find out the methods of our competitors and imitate them, but would discover methods and means now unknown by utilizing our own initiative and ingenuity. If our manufacturers will study their present opportunities well, and cooperate for manufacturing progress, safeguarding the best interest of all, it is certain that the economic struggle which is bound to follow the expiration of hostilities, will find us better equipped and prepared for the inevitable competition.

In recent years a great deal of good has been accomplished in our industry through well established welfare work, and too much praise cannot be given to those who carried on this noble work in their mills and villages. Lately, however, a great impetus has also been given to the Safety movement in our mills and other manufacturing establishments. This movement is being forwarded by three different impulses, first the humanitarian, second efficiency, and lastly the sociological. The up-to-date manufacturers are not the kind of men to permit it to be said that they could, but didn't, save their men from possible injury or death. The public sentiment today demands the Safety Idea, and it should be our policy to see that the workman shall live to enjoy the fruits of his labor, that his mother shall have the comfort of his arm in her age, that his wife shall not be untimely a widow, that his children shall have a father, and that cripples and helpless wrecks, who were once strong men, shall no longer be by-products of our mills.

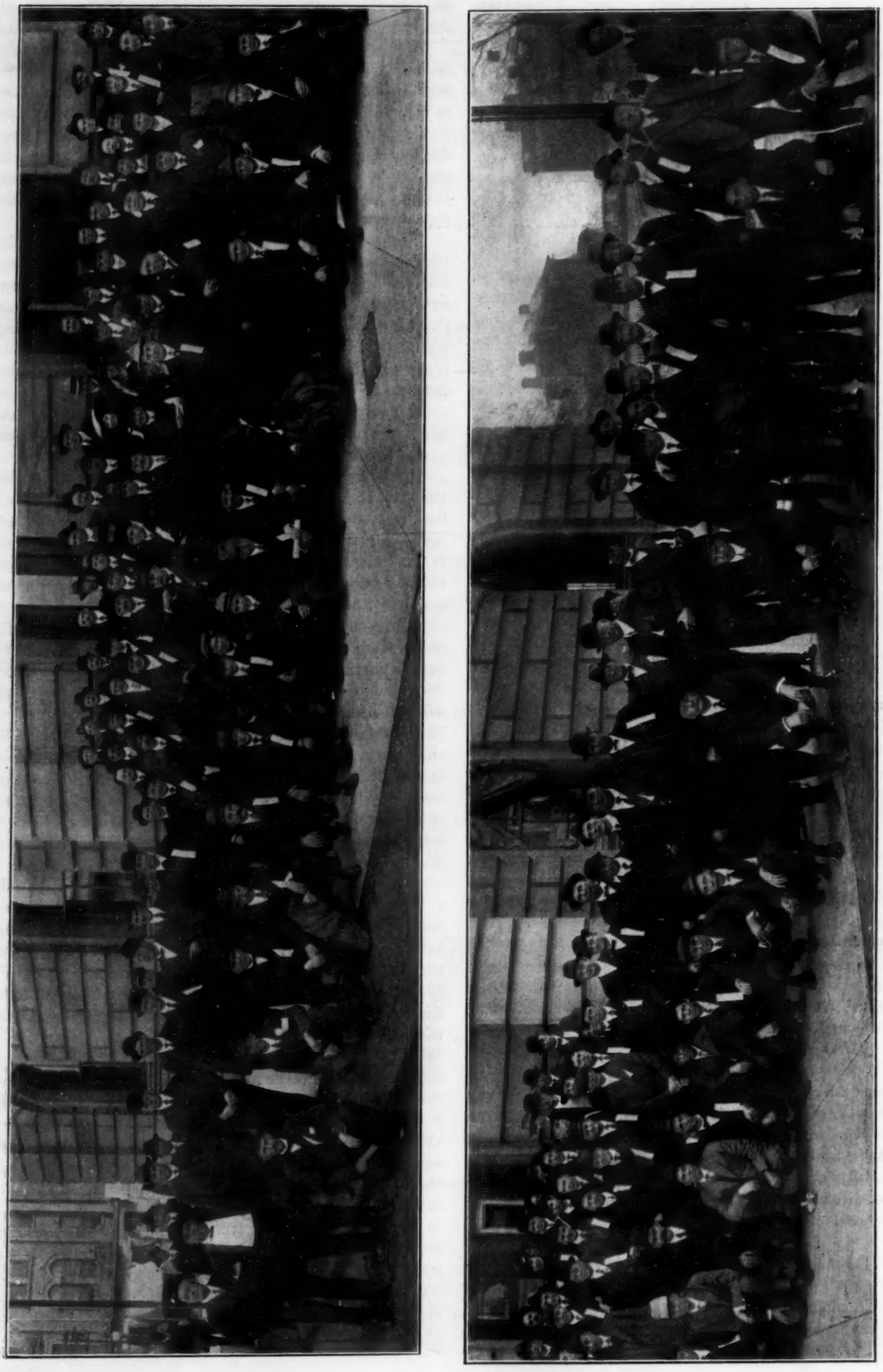
From statistics we learn that within 12 months, in the mills of Massachusetts, no less than 7,489 accidents were reported, 13 of which proved fatal. Twenty per cent were due to cleaning machinery while in motion. If this amount occurs in one state only, my friends, you can imagine the great number that annually occur in all the mills of the United States. Then do you not think it is high time that we should become our brother's keeper, and adopt means and plans for the safety of our fellow workmen? But no work succeeds unless you thoroughly plan it, and then work to the plan. There are men today who are running their places of business in a haphazard, go-lucky way, but the final result is dangerous.

One of the most thrilling sights is a modern locomotive, with its string of Pullmans, racing across cities and states to its far-away destination. It moves with such wonderful pride, more so even than human pride. Do you wonder? It has a track on which it runs and this guides it safely around curves, through tunnels, and over trestles. But what a frightful spectacle is such a train off the track. Nothing in the world is more helpless. So it is with us, unless we have formulated our plans to protect and guard against all accidents, men and women will continue to fill our hospitals; helpless, hopeless, and homeless, and I would urge that each and every one of us when we go back to our fields of labor adopt a plan that can be successfully worked, for the prevention of accidents to our fellow workmen.

After thanking the various committees for the hearty cooperation extended him in preparing for this meeting, President Heymer then made several announcements, and the general business of the meeting was taken up. The main question to be decided at this business session was the location of the place for the summer meeting of the association. After listening to the charms of the various applicants as depicted by the descriptive language of their representatives, the association voted to hold its next meeting at Wrightsville Beach, near Wilmington, N. C., on June 22nd and 23rd, 1917. Adjournment was then taken.

The afternoon was spent by the guests in an extensive automobile ride around the city, visiting the mills and other places of interest. Fully seventy automobiles were in line and the ride and its accompaniments formed a very enjoyable feature of the entertainment program.

At 8 P. M. there was an entertainment for members of the association and their friends and guests in the auditorium of the Jefferson Hotel An orchestra was present



THE SOUTHERN TEXTILE ASSOCIATION IN CONVENTION AT COLUMBIA, S. C., NOV. 17TH AND 18TH, 1916.

and dancing and refreshments were enjoyed up to a late hour.

Saturday morning found the hotel lobby congested with a number of new arrivals in addition to the previous attendance. At 10:30 A. M. President Heymer called the second session to order and introduced as the first speaker, C. C. Brigman, overseer of spinning at the Olympia Plant of the Pacific Mills. Mr. Brigman's paper is given in full, elsewhere in this issue.

The next paper on the program was on the subject of spinning and was read by Superintendent T. M. McIntire, of the Loray Mills at Gastonia, N. C. This paper, which is printed in the following pages, brought out some discussion on the part of the members. J. H. Spencer of the Barber-Colman Company, Gordon Johnstone, of the Fulton Bag and Cotton Mills, L. H. Brown, of the Brookside Mills and President Heymer of the Alexander City Cotton Mills, expressing their opinions. The sense of this discussion being that in the ordering of fly frame or other bobbins for use in the mill, it is better to have a standard drawing for each size of bobbin and order by blue print, than to depend on sample bobbins or to depend on measuring some bobbin which has been in use, when the new ones are desired. The shrinkage of these wooden bobbins cause variations which result in stretched yarn.

Following this discussion, A. D. Martin, overseer of weaving at the Clinton Cotton Mills, Clinton, S. C., read an instructive paper on weaving, which is printed elsewhere in this issue.

The next paper on the program was by C. H. Strickland, superintendent of the Belton (S. C.) Cotton Mills, and was on the subject of the management of help. This paper is also re-printed in the following pages.

Following the reading of the technical papers, a number of discussions were had on practical subjects, the one arousing the greatest interest being, perhaps, the question of how to adapt the mills to the working of the new Keating Child Labor Bill which was passed by the last Congress and which goes into effect on the first of September, 1917. This question has been carefully studied by a number of superintendents and managers all over the South, and it was a question which caused several men to attend the Columbia meeting especially to find out what was being done by their acquaintances.

Vice President J. M. Davis of the Association, who is also superintendent of the Newberry (S. C.) Cotton Mills, explained very fully the method which has been adopted in his mills and which seems to be working out with considerable satisfaction. Mr. Davis said:

"We decided that it would be unwise to wait until September first of next year before beginning to go into this question, because we might find then that what we thought would work wouldn't do at all, and we would lose just that much time, so we put into effect, soon after the passage of the law, a system to meet the new conditions. The idea is not original with us, it was suggested by a mill in the upper part of this state.

"We put in cleaners, using children between the ages of fourteen and sixteen years old for this work; so that the spinners who had formerly done this work, were relieved of it. We adopted this system and it is working very satisfactorily. In our mill this new law very materially affects us, because we are working thirty-two children between the ages of fourteen and sixteen.

"You might think it would be easy to displace these children and get older people to take their places. We might have done that, but we would affect a great many families in our mill village. The families would become dissatisfied if the children could not earn something and would leave. Another feature of the matter is that in handling these children in this way, we have a reservoir of supply which is always on hand, ready to take vacancies in the spinning department.

"We of course, have eliminated children in our mill under fourteen years to comply with the state law, but children between the ages of fourteen and sixteen we are putting in as cleaners, and taking those who are reaching the age of sixteen and transferring them into the spinning department, therefore, as I said before, we have a reservoir of supply coming along all the time for our spinning department. If we should do away with this system and employ only grown people, we would have no supply from which to draw, to say nothing of the embarrassed condition of the family financially. We satisfy the families by employing the children eight hours a day. We have this reservoir of help to draw upon to supply our spinning all the time and the families are satisfied, so this new national law will not bother us so far as spinners are concerned. We have had it in operation now about sixty days, and it is working very satisfactorily, except from the standpoint of cost, and I am not a stickler for extremely low cost.

"Our system will not apply to all mills alike, especially where there is fine work. We have coarse work, and we have to continually scrub and keep it in shape. The cleaners therefore cannot clean as many sides. I believe if you will experiment you will find it extremely satisfactory. There is another feature of it that appeals to us, we can take an inexperienced child and teach it to clean in a day or two. It takes a long while to make an experienced spinner. You can get something for your money right away by teaching them to clean, which they can learn in a short while. I believe you will find this worthy of your consideration. We find the parents like this method very much."

Mr. Davis explained that the cleaners came to the mill at 7.30 a. m. and work until 11.30 a. m. Then they come back at 2.00 p. m. and work until 5.30. As the spinners have no cleaning or roll picking to do, they can run a larger number of sides and therefore earn more money.

Following this discussion, announcements were made by the president and secretary and final adjournment was taken.

Saturday afternoon a congenial party of thirty-five were entertained at barbecue and golf at the Ridgewood Country club, the host of the occasion being Charley Boineau, the South Carolina representative of the Arabol Manufacturing Company, and I. L Griffin, of the Douglass Co. Bob Bowe and Pete Lowe were the golf stars of the occasion, although there were several others who had almost as much difficulty in hitting the ball as did the gentlemen named.

While many members left the city on the early evening trains, a large majority stayed over to the final entertainment, which was tendered by the local organization of Shriners and consisted of vaudeville stunts and music by the Shriners' band. This entertainment was given in the ball room of the Hotel Jefferson.

Inasmuch as the selection of Wrightsville Beach was made principally to give the overseers and superintendents of the North Carolina mills an opportunity to attend in a greater body than for sometime past, the officers of the association are looking forward to the June meeting with a great deal of pleasure and anticipate the opportunity of meeting a great number of those men who have found it inconvenient to attend a meeting since the meeting at Greensboro, N. C., several years ago. Remember the date—June 22d and 23d, 1917, and begin making your arrangements now.

Picking and Carding.*

BY C. C. BRIDGMAN.

A bale of cotton is a matted mass of fibers lying in all directions, with which are intermixed sand, broken leaf, sticks, broken seed and other foreign matter. The fibers themselves, although of the same quality approximately, are not exactly of the same length, even in the same bale, nor are they all ripened to the same point of maturity. Some of them may have been cut by the action of the gin or rolled into neps, that is, into small bunches of closely matted and tangled fibers that have the appearance of specks in the cotton, which, while varying in size, are generally very minute, rarely larger than a pinhead.

In order to produce cotton yarn the fiber is passed through a number of processes varying from ten in a mill making coarse yarns, to fifteen in a mill making fine yarns. These processes may be divided into three classes: First, mixing; second, cleaning; third, parallelizing and attenuating.

A thorough comprehension of the principle of cotton yarn preparation can best be obtained by a careful study of each machine or process in its proper sequence, including the objects of the machine, the principle on which it is constructed, and the mechanism employed to arrive at its objects; and by considering the operation and management of the machine not only theoretically, but from actual observation. In doing this the desired knowledge will be obtained sooner if the combined objects of all the cotton yarn preparation machines are borne in mind.

It is impossible to obtain a large quantity of cotton that will not vary in quality, because the lot is made of cotton collected from various plantations which are probably some distance from each other, and subject to different climatic conditions, seed and soil. The result is that cotton from the plantation where the conditions are most favorable is in a higher state of maturity than that raised on the other plantation. Even in bales from the same plantation a variation is found. In order to neutralize this variation as much as possible and insure the continuance of a supply of even running stock over as long a period as possible in the mill, mixing the bales is resorted to.

The quantity of cotton used in a mixing should be as large as possible, for the larger the mixing the easier it is to keep the work regular for a considerable length of time. The reason for this is that no two mixings are alike, this being due not only to the variation found in different bales of the same kind, but also to atmospheric changes that affect the cotton, especially in regard to moisture. In addition to securing regularity, another reason for having large mixings is to give cotton from compressed bales an opportunity to expand, by making a large mixing and allowing it to stand for a day or two in a room the temperature and humidity of which are about the same as those of the room in which the cotton is to be worked.

The automatic feeder is the first machine that receives the cotton after it has been mixed, and, as the name indicates, is used for the purpose of automatically feeding another machine. Formerly the opener or breaker picker was fed by one of the three methods, first, by spreading the cotton on a feed apron by hand, the amount depending on the judgment of the operator; second, by weighing a certain amount of cotton and spreading it by hand on a measured space on a feed apron; third, by presenting a portion of cotton to an opening in a pneumatic tube and allow it to be drawn in by the air current. With these methods it was very difficult to obtain a uniform feed.

The principle employed in the automatic feeder is that of having an apron with projecting spikes to carry away from a mass of cotton a larger quantity than is required, the excessive amount being removed by suitable mechanism, only that portion which is required being allowed to pass forward to supply the next machine.

Pickers are known as pickers in single or double section, according to whether they impart a single or a double beating action to the stock passing through them.

The passage of cotton through breaker pickers in single section, whether they are fed by a condenser gauge box or by a cage section, is the same. After the cotton delivered by the feed rolls has been struck by the rapidly revolving beater it passes over grid bars in order that any dirt or other foreign matter may be separated and fall through the spaces between the bars. Then it is carried over inclined cleaning or grate bars, so that other foreign matter too heavy to be carried by the air current may have an opportunity of dropping through the space between the bars. This cleaning process is continued while the cotton collects in a layer on the surface of two revolving cages or screens, through which a current of air is drawn by a revolving fan. The cotton, now in the form of a sheet or layer, is removed by stripping rolls and allowed to pass over a stripping plate between smooth calender or presser rolls and around the lap roll that rests on the fluted calender roll, thus forming a lap. Intermediate and finisher pickers are practically the same as a breaker picker in single section. Their objects are the same as the breaker picker. The lap, however, that they produce is of a more uniform weight per yard.

The lap of cotton as it leaves the picker consists of cotton fibers crossed in all directions, together with a small amount of foreign matter, such as pieces of leaf, seed or stalk, and small pieces of cotton boll. Such material is of too light a nature to be removed by the action of the beaters or to drop through between the grid or inclined cleaning bars of the pickers, so that it is carried forward with the cotton into the lap. In order to remove this foreign matter, machinery of an entirely different character from the cleaning machinery previously used must be adopted and for this purpose the cotton card is employed, the process being known as carding.

Carding is regarded by many manufacturers as one of the most important processes in cotton yarn preparation.

* Read before the Southern Textile Association at Columbia, S. C.
§ Overseer of spinning, Pacific Mills, Hampton Mills Department, Olympia Plant.

In addition to cleaning the cotton it is also the first step in the series of attenuating processes which gradually reduce the weight of cotton per unit of length sufficiently to form a thread. The lap from the picker is comparatively heavy and must be reduced considerably in weight at various machines in order to give the weight per unit of length required in the yarn.

The carding process is the one following the picking operations in all cotton mills, whether coarse or fine, and whether making carded or combed yarns. The objects of carding are: First, the disentangling of the cotton fibers, or the seperation of the bunches or tufts of fiber into individual fibers and the commencement of their parallelization; second, the removal of smaller and lighter impurities; and third, changing the formation of cotton from the lap to a sliver, accompanied by the reduction of the weight per yard of the material.

A sliver is a round loose strand of cotton without, or almost without, twist, and usually from 40 to 80 grains per yard in weight. It is generally coiled in a can at the front of the card.

The proper management of cards in keeping them in good condition is very necessary. First of all is the proper oiling of all parts. The comb box, the cylinder, shaft bearings and licker shaft bearings should be oiled twice daily. Certain other parts that do not revolve so rapidly, for instance, the doffer calender roll, shaft coiler and idler pulleys and gears, daily; while once a week, generally Monday morning, every moving part of the card should be oiled. In oiling the bearings of the doffer and cylinder care should be taken not to allow oil to get on the heads of the cylinder doffer, since in this case it is apt to come in contact with and spoil the clothing. Care should be taken also in oiling the traverse grinder roll that oil does not fly on the clothing.

The cards should be kept free from fly and dust, and it is usually the custom to clean them after the stripping process. An opportunity should be given at least once a week, usually on Saturday morning, for the cards to be stopped two hours for cleaning purposes, at which time a more thorough cleaning is given. After disturbing the settings of a card in any way the cylinder and licker should be turned around by hand to make sure that there are no parts rubbing. There should be only sufficient draft between the lap roll and the feed roll, the doffer and the bottom calender roll and the calender roll in the coiler to take up any slack that might occur between these points. Any excessive draft causes the sliver to be unevenly drawn, and thus making thick and thin places in the yarn.

When a high grade yarn is to be made it is necessary to comb the stock. For fine yarns it is essential that the short fibers should be removed, and to accomplish this the process known as combing is introduced. Therefore, for warp yarns finer than 45's, and filling yarns finer than 70's, or for numbers even coarser than these, when a high grade yarn is required, it is necessary to comb the stock. Combing, however, is an expensive operation, as considerable waste results from this process, and it is only profitable to comb when a first grade yarn is to be made.

The drawing frame is the last machine in which any extensive correction of the unevenness of the sliver takes place. It usually follows the railway head in mills that use the latter machine, except when the stock is to be combed, in which case it follows the comber. The objects of the drawing frame are: First, to lay the fibers parallel; second, to correct as far as possible any unevenness in the sliver. These objects are accomplished by drafting, which, by pulling the fibers past each other tends to make them lie in a parallel position, and by doubling, which has a tendency to even the resulting sliver. After the sliver has been formed at the card and its structure improved at the drawing frames or perfected by the use of combing machinery, much foreign matter and impurities having been removed from the stock, the fibers have been carded and straightened and laid parallel to one another, and the sliver evened throughout its whole length, but it is still in too bulky a form and must be further attenuated before it is sufficiently fine to be run through the machine that completes the operation of making it into yarn.

In addition to attenuating the sliver until the required weight per yard is obtained, the opportunity is also taken in several machines to multiply the number of doublings, which not only tends to retain the evenness of the sliver produced at the drawing frame, but also to improve on it. The sliver as it is attenuated by the processes that follow the drawing frames is known as roving. An idea of the extent to which this roving is drawn out before it is considered suitable to be spun into yarn by the mule or spinning frame may be gained by considering that a common weight for sliver at drawing frames is 60 grains to the yard, from which roving weighing 1.19 grains to the yard is commonly made before being spun into yarn, the sliver having thus been reduced in weight about the proportion of 50 to 1.

The machines used in modern mills to effect this attenuation are known collectively as fly frames. All the machines classed under the head of fly frames are practically of the same type of construction, only differing in details.

It is possible for the picking, carding and drawing to be almost perfect, and then bad uneven roving to be made on fly frames. When single or double occurs on fly frames it is unnecessary for the tender to stop and unwind the defective roving from the bobbin. In some cases so much imperfect roving has been wound on the bobbin that correct diameter of the bobbin cannot be obtained in that set; it then becomes necessary to break back the roving being fed to it, thus causing a spindle to be unproductive throughout the filling of the rest of the set, and, consequently, the production of the frame to be lessened. Roving should have enough twist so that it will not break back into the succeeding creel. If the roving is too soft it will stretch, causing thin places in the yarn.

The tension on fly frames is very important and should be watched very closely by the overseer, for if the tension is too tight the roving will be uneven and full of thin places, and if too slack the roving will wind loose on the bobbin that will stretch and break in the succeeding creel. In order to obtain the best results on fly frames it is absolutely necessary that all parts be kept clean.

The November number of COTTON contained on page 22 an article entitled "Food for Serious Thought" which was re-printed from COTTON CHATS, the little magazine published monthly by the Draper Company of Hopedale, Mass. Due credit in the article at the time it was printed was inadvertently omitted, and we hereby make amends.

Practical Ideas on Spinning.*

BY T. M. MC INTYRE.†

Very briefly, I am going to mention a few things that should be of interest to overseers of spinning and superintendents of cotton mills. I am going to mention a few of the *little things* that could be very easily neglected.

In order that a spinner may run his room successfully, the roving must be made right. It is very essential that all bobbins that the roving is on be gauged, and one size of roving bobbins used. When roving bobbins are purchased from any manufacturer, they should be purchased to be all uniform in size, which usually costs $6.00 per thousand extra; then after the bobbins are received, they should all be gauged before they are used, and if they are not uniform in size, they should be rejected, as if two or more sizes of bobbins are on the same fly frame making roving, some of the roving is certainly going to stretch, and this is detrimental to any one running a spinning room.

One of the more important things in operating a spinning room is the condition of the frame. There are numbers of spinners who don't take time enough to overhaul and get the frame in first-class condition. My idea of overhauling is that each and every frame should be gone over at least every twelve months, especially where the spinning room is on the third, fourth or fifth floor of a brick and mortar building. All brick buildings will vibrate to some extent, and when the spinning is on a floor that vibrates, eventually this will get the frames out of line, and will also get the spindles from the center of the ring at the bottom or top.

The average cost of lining, leveling, plumbing spindles, taking out steel rolls, and taking out all the bad leather rolls is two cents per spindle. When the overseer and superintendent decide to overhaul the frames, the overseer should have some knowledge of overhauling himself. The overseer should require the man he puts in charge of this work to let him know when he gets each and every frame finished, and it should be the duty of the overseer to examine each and every spindle, top and bottom, and see that the spindle is in the center of the ring. If the superintendent decides to let the overseer spend two cents per spindle, it would not be amiss for the superintendent to examine a frame himself at every opportunity, inasmuch as it takes from four and a half to five horse power to drive a spinning frame with 224 spindles per frame, or about 57 spindles per horsepower. Horsepower will vary in cost, ranging from $13 to $25 per year.

Spinners having trouble with excess of spinning bands dropping off, will find it very profitable to use one-half kerosene oil and one-half spindle oil every six weeks. In all kinds of lubricating oil there is a certain amount of foreign matter that is called "gum." If we continue to oil spindles with straight spindle oil, we will find by making tests at different times that the horsepower is gradually increasing. If the overseer of spinning will repair and overhaul his spinning frames as already mentioned, he will find it greatly to the advantage of the Company for whom he is working, and it will aid and assist him in keeping a good class of help.

My experience in regard to overhauling as I have already outlined, is that we will have less scavenger roll waste, and that means better running work, because, (1) most all mills work their scavenger waste back, and no cotton runs as well the second working as it will the first time; (2) it will prolong the life of the frames. By having the spindles plumbed, it will prolong the life of the rings. If the spindle is out to one side at top or bottom the traveler will wear ridges on the ring, and once the ridges appear they are ready for the "junk pile." By having the spindles in the center of the ring, top and bottom, we will have less travelers to buy, the yarn will be stronger, there will be less waste from the spool room, and less pieces of filling from the weave room.

The filling quill is a very important thing as there are several different shapes. When the overseer gives his order to the superintendent, he should get several quills and find one that fits the spindle perfectly, and let the superintendent send the quill and spindle to the party making the quills, and when the quills are received they should be gone over very carefully, and see that they fit the spindle the same as the sample. Where an overseer is spinning filling for looms with feelers he should be very careful in ordering his feeler quills; for if he is not, when the second order is placed and the quills are received he will have two sizes of quills. The result is that if the overseer of weaving has the feelers on the loom set right, that is, set for the larger sized quills, and the quills are not uniform in size, the feeler will knock out the small sized quill and too much waste will be left on the quill.

In most of the mills in the South the overseer of spinning has charge of the spooling and warping, and in some mills, has charge of the slashing. In my judgment the overseer of weaving should be in charge of the spooling, warping and slashing. The spooler hands and warper tenders can make a lot of bad work if they are not looked after carefully. Spooler hands very often tie knots so that there will be a kink where the knot is tied, and if the yarn has got more than standard twist in it, it will not pull out in the warper. Tangled spools are very bad on warping. Each and every spooler hand should have spools painted a different color, or use crayon of a different color for each spooler hand. This will help the overseer to keep in touch with any one of his spooler hands who is making bad work.

Where there are two or more warper tenders in the room, they very often make bad work for themselves. Very often when half and quarter wraps are run on the beams, this arrangement will make more or less waste. When it is necessary for the overseer to run half and quarter wraps on the beams, there should be a yard counter attached to the measuring rolls, so that the warper tender could run the same amount of yards on each beam. Very often the measuring roll is binding in the bearing and will slip the least bit. Very often there is a small difference in the size of the measuring roll, just enough to be discovered with a pair of calipers. This will make long and short warps for the slasher. There should be a record of all bad work made on the warpers by the slasher tender, so that the overseer in charge of the warpers can keep up with the bad work that is made on the warpers.

One of the more important things in operating a spinning room successfully is the overseer and his organization. There are two distinct factors in the successful han-

*Read before the Southern Textile Association.
†Superintendent Loray Mills, Gastonia, N. C.

dling of men. First the overseer's executive ability. Second, the workers, or subordinates. He must be master of himself before he can be a successful overseer of spinning. No man can hope to successfully handle other men who cannot first master himself. Some examples will illustrate:

There is a type of man who is often found in a position where he has charge of others, who is himself inefficient. He is careless, he is thoughtless, he is hot-headed and emotional. He constantly makes errors. He loses and mislays things. He procrastinates. And for all of these inefficiencies, he holds himself blameless and throws the responsibility upon his subordinates. No one ever knows where to find him, or how to please him. He is as whimsical as a spoiled child. When pleased he is honeyed of speech and extravagant in his praises. When displeased, he is erratic and vindictive. He makes promises lightly, which perhaps at the moment he expects to fulfill, but he quickly forgets them. This man and every one with whom he comes in contact, are at the mercy of his emotions. His intellect, will and sense of justice are all subordinate to the way he "feels."

Another type is the self-centered man who measures every one by his own erroneous conception of himself. In a position of authority, he sets himself up to be adored and worshiped. He is extremely jealous of his authority, wants to know it all, and resents suggestions from any one, probably fearing that to accept them will lower him in the estimation of others. This man is usually prejudiced, narrow and bigoted, and in dealing with others assumes a patronizing air. In rendering decisions he is apt to show the most unexpected pettiness.

Another, unsuccessful in the highest term, is the unsympathetic, harsh, exacting, unforgiving, relentless man who attempts to rule others by fear. Fear like brute strength, is one of the crudest weapons possessed by mankind. Fear always engenders hatred. So the man who is feared invariably has the hatred and contempt of others. None of these types are successful in handling men. There are many others, some of them no doubt will be suggested by those we have described.

There are certain qualities of character which appeal to all mankind. The individual who possesses them can handle others without difficulty. At the head of the list we place a keen sense of justice. In the meaning of the term, a sense of justice includes honesty, the disposition to give the "square deal," integrity, truthfulness and the ability to weigh all the evidence before rendering a decision. No matter how untruthful and dishonest a man may be, he invariably respects one who is truthful and just. Scarcely less indispensable than a keen sense of justice is the quality of dependableness, steadfastness, or constancy.

Successful dealing with others sometimes requires great courage. It takes courage to administer rebuke, even when the offender richly deserves it. It takes courage to refrain from being extravagant in one's praises when a kind act has been directed towards one's self. But perhaps courage is required most of all to admit that one is wrong. And so, third, on our list of desirable qualities of character we place "courage."

Even the most irresponsible and callous individual is mellowed when convinced that you are interested in him and his welfare. The quality of human sympathy is indispensable in dealing with others. We often criticise others harshly and unjustly, largely because we are unable to put ourselves in their places.

I have known men to possess all the qualities I have mentioned and yet fail of the greatest success because they lacked the tactfulness necessary to handle a difficult situation. There are others who are so austure and tactless that their words are like sledge hammer blows, and when, with the best intention, they administer a reprimand, they are often surprised to find they have utterly paralyzed the activities of their workers. It requires both courtesy and tactfulness to deal successfully with others. There are none so wise but that they may learn from others.

Weaving.*

BY A. D. MARTIN.§

To operate a weave room successfully it is necessary that we begin at the spooling, assuming that the yarn is good when it goes to the spooler. It is very important to see that the spooling is done right. One of the biggest things that is affecting the production on the automatic loom is the kink knots caused by spooler hands failing to hold the yarn, after tying the knot, long enough to pull out the kink. I have, at different mills, when the work would be running bad, had the weaver keep a record of each loom stopped and the cause of stoppage, and I have always found that the kinks were responsible for more than one-half the stoppages. Especially is this true on light pick goods.

The warping is laying the foundation for either good or bad slashing and weaving. This process should be looked after by a very careful and attentive hand, one who wants the work to run after it leaves the warper room. When a beam is filled, before creeling the warper, all lint should be fanned out of the creels and drop wires should be well cleaned, so that when starting a new beam all drop wires will work when a thread breaks and cause the warper to stop immediately.

The slack roll should be kept working well so that when stopping the slack will all be kept out of the yarn, preventing kinks in the warp. The machine should be kept well oiled and cleaned and the measuring roll should work freely at all times. The beam journals should be kept straight and true, so that there will be no high and low selvages. The comb should be properly spread as soon as the warper is started after creeling, and care should be taken always when starting warpers to prevent breaking and straining the threads. All friction that is possible should be kept off the threads, for strength and elasticity are very essential to good weaving.

Slashing is a very important process and is almost the key to a successful weave room. The slasher foreman should be a man who attends strictly to business at all times. He should weigh each mixing of size and not rely on measuring starch and compounds, which may cause a variation of several pounds in each kettle of size. Lease strings should run up often enough to keep ends from being stuck together. It is a good thing to use what is called slasher tape to stick all ends together where the beams are doffed. This tape should come over the head of the loom

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§ Overseer of Weaving, Clinton Cotton Mills.

beam just far enough to stick to it. This will keep the ends from getting tangled in case the beams are rolled over on the floor or placed on a beam rack.

In doffing the loom beam the yarn should be cut right up at the tape, so as not to make any waste. If a few inches of waste is made on each loom beam, and we are running several slashers, it will soon amount to a whole warp. Having a good warp, it is now necessary that we have conditions in the weave room to suit the class of goods we are making. For heavy sized warp it requires more humidity than it does for warp not sized so heavy. If we size just right, enough for the warp to open up good and not stick or mat up behind the harness, our work will run better than it will to load the yarn too heavy. Sizing heavy to increase the weight of the cloth is not a good idea, unless it is on a real coarse number.

The question now arises as to how we are to get the best quality and quantity from our looms. To do this it is necessary to have a good, competent set of loom fixers. Have them to inspect the cloth on each loom every day, to see that there is no stringy selvage, wavy or roey cloth, miss-draws, bent reeds, and so on. Thick and thin places can very often be detected when inspecting the loom. We also want the very best production possible, and to get this we must see that every loom is running and making the required number of picks.

Some looms run slower than others because the belt is not pulled far enough on the tight pulley. If the belt shipper is working free the belt can be made to clear the loose pulley when the loom is running. A number of slack belts here and there will also be a bad drawback to production. Shuttles should be pushed back in the shuttle boxes before starting time, so that every loom will be running in two or three minutes.

The first hour of the morning is the most important hour of the day. The overseer should be in his room before the regular starting time, to see that the humidity and temperature is right and to see that all help are at their places. The second hands should see that the looms are started on time and report any help that are out. The loom fixers should be trained to respond promptly and pleasantly when the weavers call them. The trouble may be trifling, or even caused by the weaver himself, but regardless of the cause, it is the fixers duty to investigate for himself. The overseer of weaving should be able to detect bad work and to determine its cause. To do this he must understand the process, not only of his room but also the preceding processes of manufacturing. The production of the weave room depends to a great extent on the good work in the preceding processes and, for this reason, great care should be given to the manufacturing of yarn and its preparation for the loom.

Let me say that too much attention cannot be paid to keeping machinery properly adjusted and oiled. The best machinery, if not given daily attention, will not only refuse to do good work, but will go to pieces. Carelessness in a small degree may not only ruin the life of machinery, but also result in serious accidents.

As regards the labor cost of production, we all know that the labor cost of weaving is in the neighborhood of one-half the total labor cost in the entire process of manufacturing cotton cloth. It is necessary, therefore, that we should be unremitting in legitimately bringing down the cost of manufacturing and it is very important to pay the closest attention to this particular department. We must take advantage of the wonderful, almost human, automatic labor-saving machines. The automatic loom not only lessens the cost of manufacturing, but reduces the number of operatives more than one-half.

Then we have the blowing-off system for cleaning off looms by compressed air. This system, while doing the work more perfectly, has also made it possible for one man to do more and better work than six men with the old hand brush. But with all these improvements we must not think that we have reached the top in the art of manufacturing cotton goods, and it may be a long time yet before we have reached perfection. Not only should we take advantage of the automatic loom and improved machinery, but we must be on the lookout for the simple labor and time saving devices which are products of the fertile brain of the practical man. The mill man is looking for everything good that will stand the test. Simple conveniences may bring large savings in dollars in the course of a year's time. Among recent inventions of this class we might mention the cam device and rocker shaft bearing, placed on the market by the Clinton Cam Company, the former being an invention of a loom fixer in the Clinton Cotton Mills, and now in general use. From an attempt to find a remedy for a worn cam, we have a product which will also effect an economy in protecting cams from wear, as well as counter-balancing the shaft.

"Safety first," cleanliness, efficiency, economy, less cost and greater and better production are fit mottoes for the weave room. The man who is wanted by any business concern is the one who is watching out to lessen cost, increase production and generally help the efficiency of his department. Nowhere are competent men more needed than in the weave room, the center of cost and output. A good overseer of weaving has often been the determining factor which has saved the financial life of the mill.

Management of Help in a Cotton Mill.*

BY C. H. STRICKLAND.†

The management of help in a cotton mill is a subject that I fear most of us fail to give enough of our serious thought and study, from the fact that we are prone to think that if we have enough help to keep the machinery going it is all that is necessary, regardless of what class it is, and in so doing, we a great many times, find ourselves at a loss to know why we are not getting the results that we should get. In most all instances of this kind it has been found that although there may be a man on every job, the truth is, that the mill is short of help, not short in quantity of help, but short in quality; by this, I mean help that is loyal, competent, and interested in their work. A man not interested in his work and has nothing in view but pay-day and Sunday, is a high priced man at any rate, and the fewer of that class of help we have the better.

I believe that if all the help around the majority of the mills were loyal, competent, and interested in the work as they should be, that the mills could not furnish regular work for all of them, regardless of the cry of the scarcity of labor. In view of the fact of the labor law that is soon going into effect, and that labor is scarce already, it becomes

*Read before the Southern Textile Association.
†Superintendent of the Belton (S. C.) Mills.

our duty as superintendents and overseers to think more seriously over this important matter, because I think that in this lies, to a very great extent, our future success as mill men. I would not attempt to say that any of us will ever reach perfection in the management of help, but I do think that there is considerable room for improvement along that line, and that organization is the key note.

Superintendents and overseers should inspire every operative under their supervision with a spirit of promotion, from the sweeper up to the highest positions. In doing this he not only gives the idea of something to work to, but he also cultivates in them an ambition to do something. I don't mean that we could promote everybody to boss jobs, but we could have everything so organized that each man would be ambitions in getting the next best job to the one he is on. Take the sweeper for instance; if he is sweeping in the weave room, have him looking forward to the next oiling or filling job and on up to weaving, and even after he has learned to weave, cultivate his ambition to get the best set of looms in the mill, and let him understand that if he is a good weaver that he stands a good chance of promotion to loom fixing and so on up. Let this rule apply to all of the departments of the mill and you will have a set of help in the course of a few years that will be second to none, all doing the best they can to obtain the best results, being assured of the fact that when openings for better jobs come, that the next best man will be promoted and not necessarily the one who has been at the mill the longest.

Another important matter to be considered in the management of help is good running work. Nothing will dissatisfy a set of help more than bad running work, and it will take one-third more help to operate a mill where the work is running bad, than it will where the work is running good, because of the fact that dissatisfied help does not work regularly and will all the time be complaining that they are not making enough to live on. Put this same mill in good running order so that it won't worry the life out of the operatives to run it, and they will run more and work more regularly, and at the same wages they will have more money and instead of complaining about bad running work and low wages, they will be boosting your mill. It is not altogether wages that satisfy people. What people want to-day is their work and surroundings made attractive, and reasonable wages.

Management of help is not confined to the inside of the mill altogether. The influences on the outside are largely responsible for results on the inside, let them be good or bad. We should use every effort to encourage education, good morals, and religion. We should get the children in school as soon as they are old enough, and we should insist on their parents putting them in, and keeping them there as long as they can reasonably do so, because that is the time when the foundation for both literary and good moral training is laid. Then we should encourage the people to bring the children to the Sunday school; I say bring them, because I am not a believer in sending children to Sunday school and their parents staying at home. It is good for grown people too. I believe in community work, and the best institutions for any community are a good school and a well organized church and Sunday school.

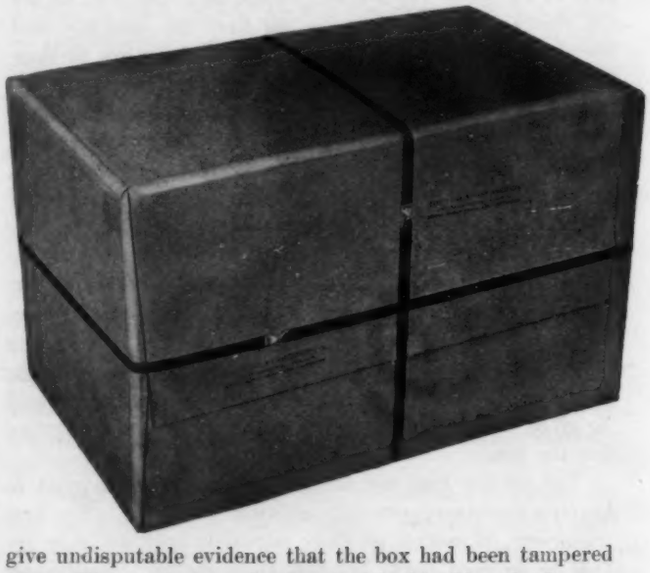
A child that has been in school from the age of six to twelve, and has attended a good Sunday school regularly, makes, nine times out of ten, a more loyal and efficient operative, and a better citizen than one that has been allowed to loaf the streets until he is old enough to work in the mill. This is no supposition on my part, as I have observed this matter very closely for the past several years.

If we expect very good morals in our villages we must select moral men for overseers, second hands, and section men; men who set good examples by their everyday lives, and who will stand by us in stamping out anything that stands for wrong, and will not knowingly employ a habitual drunkard or gambler, but in case one does happen to get into their midst, let him know at once that he is in the wrong pew, and that he must get in line or get out. Superintendents should keep in touch with their overseers in regard to the character of each individual operative, for in this way he can keep right up with the bad characters and get rid of them before they have done much damage. I will venture the assertion that he can get two good ones for every bad one he runs off. A mill can have no better advertisement than that it works only first-class help.

Let us do all in our power to hasten the day when everyone connected with the mill from the president down to the humblest operative will work hand in hand to make his mill the best mill.

Acme Package Protection.

The Acme Signode Strapping System is a unique sealing device which makes pilfering in transit impossible. It is especially adapted to the fibre carton although it can be used to good advantage on wooden cases as well. It is found to be a most practical device for tying bales of yarn and other material, as it is quick to apply and very durable. The application of this method adds to the strength of the containers; furthermore a box cannot be opened without destroying the strap and seal and this would



give undisputable evidence that the box had been tampered with. The steel strapping used with this Signode System is known as the Acme Signode strapping and is made of special analysis steel of great tensile strength for use with the patented stretching and sealing tools. This strapping is provided in coils of convenient sizes and mounted on wooden reels.

Full information may be obtained by applying to the Acme Steel Goods Co., 2834 Archer Ave., Chicago, Ill., or to their Southern office at 10-14 Tift Street, Atlanta, Ga.

Locating Manufacturing Costs

BY HENRY D. MARTIN.

Locating accurate manufacturing costs is one of the more important branches of the cotton manufacturing office. It is also a most interesting task to perform when the method is properly understood. For want of a thorough knowledge of securing accurate manufacturing costs, money may be lost in two ways. First, in the loss of business on account of having prices too high, thus losing orders which should have been available, and second, by accepting orders at prices too low to admit of making a reasonable profit. The raw material may be ever so reasonable in price; the plant splendidly equipped to produce a line of goods; and the superintendent thoroughly competent to make good work, but if the bookkeeping is insufficient and careless, money may be lost just the same.

Costs depend upon good bookkeeping; on keeping the facts accurately gathered from various sources and assembled properly. Some men are expert in the production of goods, but inaccurate in the gathering and assembling of the facts for the cost-finder's desk. It is as important to have the cost data properly presented, as it is for the cost finder to build the cost sheet right.

There is another class of manufacturers who have a thorough knowledge of the necessary facts to gather, and the proper matching up of these facts, so that cost finding by the office is a pleasure instead of a nightmare. Otherwise it is painful work for the expert manufacturer, if his presentations are warped into meaningless figures by improper office work. Accurate costs, then, depend upon good bookkeeping throughout the entire manufacturing process as well as in the office of the business.

The facts necessary to gather in connection with securing accurate costs may be quite simple or very complicated, depending upon the equipment and the variety of products of the business conducted. To illustrate the point, we will take the matter of securing yarn costs. The simplest form of a yarn account is when the plant is making only one number of yarn from one kind of stock. The total average cost per pound of the product is arrived at in the most simple form by merely dividing the total expenditures by the total pounds produced for a given time. Of course the total expenditures must include the price paid for the raw material, plus the loss caused by shrinkage in process, less the money received for the waste products.

If a plant puts through 12,000 pounds of raw cotton and obtains a finished product of 10,080 pounds, there must have also been a waste product of 1,920 pounds, or about 16 per cent. If the raw cotton costs 10 cents per pound, and it costs 10 cents per pound to make a given number of yarn, and if an average of 3 cents per pound is received for the waste as sold, our example will be,

10080 lbs. yarn manufactured	at .10 =	1008.00	$2208.00
1008 pounds yarn manufactured	at .10 =	1008.00	$2208.00
Less 1920 pounds waste	at .03 =		$ 57.60
			$2,150.40

Total average cost of the yarn per pound, .21335

Another way to find this result is,

10080 pounds yarn total manufactured cost at .10	1008
10080 pounds raw cotton at .10	1008
1920 pounds raw cotton as waste, at .10	192
	2208
Less amount received for the 1920 pounds waste at .03	57.60
Total yarn cost per pound .21335 cents.	$2,150.40

Thus far all of this work looks very easy, but the truth is that these two rules or methods cannot work accurately in practice. Either of these methods would work all right if the plant were operated in closing out periods of this capacity. That is if the plant took 12,000 pounds of raw material and put in through by itself until the whole had been manufactured and cleaned out. But the plant is not run in such periods or lots. As the stock passes through the plant there is no dividing line between one production period and another at any point in the process throughout the plant. Therefore, in order to get at the accurate cost example while the plant is still in operation without a productive dividing line at some point within the plant, it is imperative to take as accurate an account of stock as possible to periodically bring out the correct productive costs.

Let us take a four weeks' period, as an example, to show what it means to get lined up more closely to our subject.

Stock of cotton on hand June 1st, 200,000 pounds, valued at an average of 8 cents per pound, $16,000.

Operation for four weeks ending June 28:

Cotton opened	50,000 pounds
Yarn produced	40,320 pounds
Waste	7,680 pounds
Stock on hand	202,000 pounds

VALUES.

50,000 at 10c = $5,000

40,320 at 10c = 4,032—$9,032

Received for the waste at 3 cents per pound, $230.40, which we must deduct from the total expenses, $9032 — 230.40 = 8,801.60.

Value of stock on hand June 28th, 202,000 pounds, at 8½ cents, $17,170 less $16,000, which is the value of the stock on hand June 1, four weeks previous. Deducting this difference from the total expenses we have $8801.60 — 1170.00 = 7631.60 the balance divided by the yarn produced gives the accurate cost per pound for the four weeks' period.

Example, 7631.60 ÷ 40,320 = .1893 cents cost per pound.

These figures show the exact yarn cost. If the superficial cost had not been corrected by the account of stock, it would have been abnormally high. The reason for this is that so much more cotton was opened than was actually manufactured into finished yarn, and which is furthermore proven by the stock account as shown. Another important matter which the stock account shows is that the plant has been able, not only to take care of the normal production, but has been able to work up some of the extra cotton opened and advance it well along into higher processes to

bring it up to a high state of valuation. That is why the account of stock stands at an average of 8½ cents per pound instead of 8 cents per pound, as per the figures of four weeks previous. This shows progress in this case and it is this progress which has reduced the cost of the yarn from .21335 cents per pound down to .1893 cents per pound.

The reason why the value of the stock on hand at stock taking periods must be reckoned with is obvious to the student of cost finding. If the value of the stock on hand is greater than the previous year, the extra money put into the plant in the meantime is not a business clearing, because the goods are on hand and the value is there. So the gain must be deducted from total expenses to get the true costs. On the other hand if the value of the goods on hand is less than at the preivous period, then this difference must be added to all outgoing expenses to get the true yarn costs. If the value of the stock should be less, in all probability the production has been proportionately large enough to still keep the costs low. Otherwise the cost will be more $115.36 to be added to the general cost expenses 7631.60 + 115.36 = 7746.96 and this divided by 40,320 pounds = .19213 cents as the cost per pound.

In order to facilitate the cost record on new construction work it is well to use a form for this purpose. Fig. 1 shows a suitable and convenient form.

The careful student of cost finding can readily see that if the total sum of $15,000 spent for building equipment were counted in as cost expenses, the yarn costs would not only be inaccurate, but prohibitive. Therefore, there must be a distinction made between what should be charged off as an expense against production and the amounts which should be accredited to increased assets.

There is still another stage of cost finding which counts much in bringing out accurate costs and also individual departmental efficiency in decreasing costs. To accomplish this, some leading plants have adopted the weekly departmental cost, independent of the general cost. There is abundant reason for the importance of this system. It puts

BLANK MILLS

COST IN CONNECTION WITH NEW CONSTRUCTION

DESCRIPTION OF WORK _____ FOR WEEK ENDING _____ 191__

DEPARTMENT	YARD		CARPENTER		PAINTING		MACHINE		ELECTRICAL		BELT	
	LABOR	MATERIAL	LABOR	MATERIAL	LABOR	MATERIAL	LABOR	MATERIAL	LABOR	MATERIAL	LABOR	MATERIAL
EXCAVATION-FILLING												
HANDLING FREIGHT RIGGING3												
STEAM PIPING, COVERINGS												
WATER PIPING HOT AIR PIPING												
ELECTRIC LIGHTING ELECTRIC POWER												
BRICKWORK CONCRETE AND STONEWORK												
PAINTING-ROOFING												
MACHINE WORK MILLWRIGHTING												
SHEET METAL WORK PLUMBING												
WOODWORK-ERECTING												
BELTING-LEATHER WORK												
DRAFTING												
SUPPLIES												
REPAIRS												
SUPERVISING												
MISCELLANEOUS												
TOTALS												

FIG. 1. FORM FOR NEW CONSTRUCTION WORK.

It is the same with the outlay for new buildings and machinery. The money has been spent, but these large amounts do not belong to the cost account in total. The plant additions, and extra machinery installed is there in value, and the only items which should be figured against production to get the costs is the allowance for depreciation and the interest on the amount of outlay.

To illustrate this point to advantage, let us take our last example and suppose that in addition to the net cost expense of $7631.60 there had been expended $10,000 for additional buildings and $5,000. for new machinery. At the yearly rate of 5 per cent interest for the $15,000, for four weeks this would be $57.68. Adding the same amount for depreciation of buildings and machinery we have a total of

a premium on each departmental effort. In these days, owing to more or less unbalanced conditions, generally, one department may run behind or ahead of another, and if the cost per department is only figured upon the basis of the plant's finished product, there is much of valuable interest lost. Let us suppose, for example, that the following is the status of the productive effort of the general departments of an ordinary cotton mill: carding, 19,000 pounds; spinning, 17,000 pounds; weaving, 20,000 pounds, and finishing, 18,000 pounds.

In most cases the cost will be based all through a plant by the product finished. Estimating that the general cost is 30 cents per pound for 18,000 pounds, then the efforts of the weaving and carding departments are discounted

by the finishing department. After making all due allowances for waste, the carding is considerably ahead of the spinning department. If these conditions are general, the carding is being held back by the spinning department. Although the weaving shows increased production over all other departments, this department cannot long remain in this position without being obliged to buy yarns. As the finishing is not keeping up it will be necessary to finish goods outside. That is, the weaving is being cramped in efficiency behind and before. In many plants, the maximum effort of the individual departments would have never been known, had it not been for the departmental cost system. By this system a plant discovered that the yarn department gained each week over the succeeding departments, and so they put in more looms and obtained more cloth without adding more preparatory machinery.

DYE HOUSE COSTS

MILL Nº_____ WEEKLY REPORT DATE

SHEET Nº_____ YARN Nº_____

COLORS	LBS	OUTLAY		COST PER LB			REMARKS
		LABOR	DYE STUFFS	LABOR	DYE STUFFS	TOTAL	
TOTALS							TOTAL AVERAGE COST
					OVERSEER		

FIG. 2. FORM FOR DYE HOUSE COSTS.

In our present example, figuring the cost on the basis of product from each department the respective departmental costs would range as follows:

DYE HOUSE RECORD

MILL Nº_____

SHEET Nº_____

YARN Nº_____

SHADES_____

DATE	BLUE Nº1							BLUE Nº	
WEEK	LBS	OUTLAY		COST PER LB			LBS	OUTLA
ENDING	DYED	LABOR	DYE STUFFS	LABOR	DYE STUFFS	TOTAL	DYED	LABOR

FIG. 3. DYE HOUSE FOLLOW-UP SHEET.

	Departmental basis.	General basis.
Carding	.2842 cents	.3000 cents
Spinning	.3177 cents	.3000 cents
Weaving	.2700 cents	.3000 cents
Finishing	.3000 cents	.3000 cents

When department managers note that the general cost is higher than when based upon their own individual department efficiency, they know they are being duly credited. But the difficulty of cost finding grows with the variety and diversity of the product. Thus far our problem has only covered general conditions in a one product plant. In a plant making a large variety of yarns, the cost must cover all details. The best system is that which shows the cost per pound per process, per number; also the same details for all other outside costs. Having a good system for getting the cost per individual number enables a factory to secure accurate costs for different fabrics.

Some theorists have maintained that it is not feasible to secure dye house costs per pound, per number, per color, but this is not so. The writer has found by practical experience that it is entirely practicable to secure not only the cost per pound per color, but the cost per pound, per color and per number as well, and at the same time secure the costs for different kinds of dyestuffs used to produce the same color. This system enables the cost department to secure much more accurate cloth costs. It also enables the purchasing department to buy the best colors adapted to the goods and processes at the most reasonable prices. It also tends to balance the output of the plant to a better advantage. As an instance of this it may be cited that where a mill is fully cognizant of the actual cost of each pattern, per color, per number, instead of an average cost for a given lot of mixed goods, the danger of having certain patterns running into more costly colors and being sold at a loss is entirely eliminated.

WEEKLY COST REPORT

MILL Nº_____ DATE _____

SHEET Nº_____ DEPARTMENT

GOODS							REMARKS
LBS							
YDS							
PROCESS PIECE WORK							
" " "							
" " "							
" " "							
" " "							
" DAY WORK							
" " "							
" " "							
" " "							
SUPERVISION "							
REPAIRS "							
SUPPLIES "							
ALL OTHER "							
COST PER LB.							
" " YD.							
TOTALS							

FIG. 4. THE DEPARTMENT BLANK.

In the past it has occurred that a lot of sample colored goods were made and offered at an average price per yard. After the buyers had made their selections it was found that the weight of the selections ran into the higher priced colors and the more attractive patterns. The average cost figures were found to be painfully inadequate to survive a profit for the firm. Accurate costs should be the dominating effort in all cases, and these cannot be ascertained without accurately gathering the facts which will give the details of the cost per pound and per yard for the different numbers, colors and patterns for each process. The plant which

accomplishes this knows its costs. Its cost sheets are properly built and its officials know before they sell the goods exactly what the margin of profit means to them.

Having both the cost *per pound* and the cost *per yard* furnishes a proof or self balancing measure which is indispensable.

In order to follow up dye house costs there must be a good system of weekly cost sheets. Fig. 2 shows the style of report used by one of the large plants. This style of cost sheet embodies the cost per pound, per number for each color dyed. It also divides the cost between the

RECORD OF SAMPLE Nº

DATE RECEIVED
SENT BY
VIA
AMT ORDERED
ASSORTMENT WANTED
NAME OF GOODS
YDS PER LB
PRICE QUOTED
DELIVERY DATES
DELIVERY PROMISED
ORDER ACCEPTED DATE
ORDER FILLED

NO OF YARN	COLOR	PER CENT	COST PER LB PER COLOR	CLOTH COST PER LB	CLOTH COST PER YD	SELLING PRICE	REMARKS
30's	Red	5	4 d	.0020	.0074		
30's	Yellow	5	8 d	.0040	.0148		
30's	Blue	40	3 d	.0120	.0324		
30's	white	50	½ d	.0025	.0095		
TOTAL				.0305	.0731		
ALL OTHER COSTS				.02	.060		
TOTAL				.0405	.0611		

COST FINDER

Fig. 5. Cost Finder's Report.

actual labor and that of the dye stuffs which is very important. Often times the cost of the labor is negligible compared to that of the dyestuff and vice versa.

In the office, these weekly reports are carried out onto the cost follow-up sheets as shown by Fig. 3. The sheets are made out in groups. That is, the blue shades are grouped as are also the reds, pinks, browns, greens, etc. This enables the management to make close comparisons between the prices of the different degrees of shading. Also that the costs can be followed from week to week with reference to fluctuations. Undue irregularities can

BLANK MILL

DAYS RUN
HOURS RUN

LABOR. COST FOR ____ WEEKS ENDING ____ OPENING AND PICKING

TOTAL FINISHERS RUN					
PDS. LAPS MADE					
WAGES OPENING					
WAGES PICKING					
WAGES GENERAL					
TOTAL WAGES					
COST PER POUND					
PDS PER FINISHER					

Fig. 7. A Card System Method for Cost Details.

thus be traced and accounted for.

An adjustable cost sheet is shown in Fig. 4, in that it can be adapted to almost any department, for any number of processes and as many different kinds of goods. They are designed for weekly departmental use, and cover the piece work separate from the day work costs. The items of supervision, repairs, supplies, etc. are also maintained separately. Having the cost per yard in addition to the cost per pound not only gives much desired additional information, but one is a check on the other, and offers a self balancing account to avoid serious mistakes. The departmental cost sheets serves a two fold purpose. One is that it induces the departmental management into being reasonably economical. The other is a reasonable forecast for the office and is a check upon the final official cost accounting. There is a third advantage which is an aid to holding up and closing out goods being made at prohibitive cost with the sample lots. That is, the operations never reach beyond the experimental stage. For want of such a system, many plants have suffered losses which were carried on account of not learning the costs until the fiscal period of costing was listed.

For showing the advantages of the system of having detailed costs per pound, per number and per color in the dye house attention is directed to Fig. 5. In this case a piece of cotton shirting, five yards per pound in weight, is analyzed and found to be all of number 30s yarn and of four colors in the following proportions:' 5 per cent each

CLOTH ORGANIZATION SHEET

SHEET Nº ____ DATE ____

CHARACTER OF GOODS	LOOM PARTICULARS	FINISHED PARTICULARS
NAME	WEAVE ____ PRICE ____	LABEL
STOCK	HARNESSES	FINISH WANTED
STYLE	REED ____ SLEY ____	PATT REPEATS
PATT	WIDTH IN REED	WIDTH
CORDS	FILLING Nº ____ WARP Nº ____	ENDS PER IN
SELVEDGE	PICKS PER IN	PICKS PER IN
YARDS PER LB	SHUTTLES	YDS PER LB
USED FOR	LOOMS AVAILABLE	
	YDS PER L'M PER DAY	

WARP			FILLING			
COLORS	ENDS	DENTS	PATT. Nº1	PATT Nº2	PATT Nº3	PATT. Nº4

ANALYZED BY ____
DESIGNER

Fig. 6. Cloth Organization Sheet.

of red and yellow, 40 per cent blue and 50 per cent white. The fifth column contains the average prices for these colors as found for the previous season from Fig. 3. As there are five yards per pound, one-fifth of the cost per pound equals the cost per yard.

The advantage of this system is still further shown when goods are ordered in assorted sets of patterns as is usually the case. Assuming that the foregoing sample described is Pattern No. 1 of the assortment and that the other two cost respectively as follows: Pattern No. 2, .08 cents per yard and pattern No. 3, .09 cents per yard and pattern No. 1, .0681 cents per yard, which equals a total of .2381 cents. This divided by 3 = .0741 cents per yard. This shows an average price for the assortment to be .0741 cents per yard or .3705 cents per pound. Now let us suppose that the buyer desires to have the cases packed in uneven assortments as follows: 25 per cent of pattern No. 1, 25 per cent of pattern No. 2, 50 per cent of pattern No.

3. Then our rate will assume another complexion and is raised to 8⅕ cents per yard or .4101 cents per pound.

It can readily be seen that it makes a vast difference as to how costs are found, made up, and selling prices formed. If the selling price is made on the basis of one pattern or of an average price of three patterns without taking into account the variety of assortments wanted, a great deal of money may be lost.

Previous to entering the cost figures upon form Fig. 5, the sample piece of goods will be analyzed by a competent designer who will enter the organization of the cloth complete upon form Fig. 6. This form covers very important ground with reference to securing accurate cost figures. The first column indicates at the outset the character of the goods. Section 2 shows the plain or the more intricate weaving problems which confront the job. Column 3 will show whether the goods as finished will tally with the buyer's sample. The bottom half of this form brings out the colors and their order of arrangement. All of these points will bring out the various cost figures and avoid confusion and the embarrassments of the guesswork-systems which prevail more or less throughout many places. Fig. 7 shows a sample of departmental cost card systems for keeping cost details during the opening processes, as practiced in a leading yarn mill.

The Shingle Roof That Does Not Burn.

Most pictures of fires taken after the trouble has happened, show only a series of ruins. But here in this picture from Birmingham, Ala., is a striking change—a house that did not burn because it was covered with fire-resisting shingles. When a toy balloon lodged on the roof of the farthest house at the left, and promptly ignited its inflammable roof, the house burned merrily, and as promptly passed the flames on, via the flimsy shingles, to each of the other houses, until finally four homes were destroyed. But the house on the right was covered with asphalt shingles. Although its sides were badly scorched, and although burning brands and sparks rained on its roof, it passed through the ordeal practically unharmed.

This serious fire, coming on the heels of several others of like nature, moved S. A. Middleton, the chief of the Birmingham fire department, to write that he wished that every residence in Birmingham were covered with this fire-resistant roofing. He said: "The fact that the big house was covered with asphalt shingles is all that saved it from serious damage, as the side of the house was badly scorched and burned by the intense heat. I consider that the asphalt shingle renders a building safe from flying sparks, and that there is very little danger of fire communicating to a house covered with these shingles. I would be glad if all the residences in Birmingham were covered with asphalt shingles, as more than fifty per cent of fires originate from sparks on shingle roofs, and the number of fires would be materially reduced and the danger of fires spreading would be reduced to the minimum."

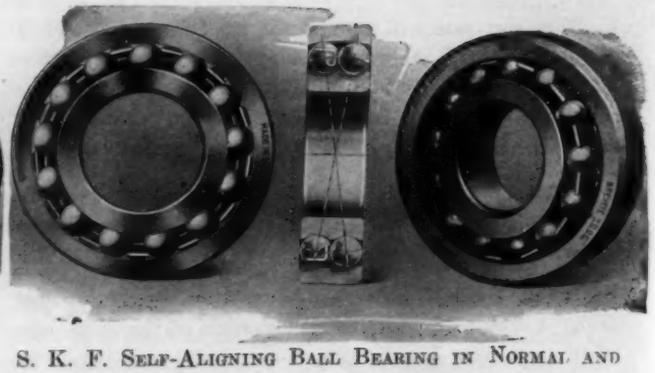
A very small part of the money usually spent in a city for fire protection will accomplish far more if spent for fire prevention. And where fully 50 per cent of the fires originate from sparks igniting the roofs, it is easy to see where half the fires are unnecessary and can be easily prevented by using a roofing which sturdily resists such dangers.

Every month the tragedy of the shingle roof is repeated over and over again in the various cities of the country. Time after time the same cause is at the bottom of many destroyed homes and homeless families. And all this loss is preventable with a little foresight in building, using a material which is no more costly than an ordinary roofing, but which becomes a never failing guard against the cause of practically half the fires in homes. When home builders think of this before they build, or when they are about to reshingle their houses, they will take a tremendous step forward in preventing such fires as this at Birmingham, and the still greater fires at Paris, Texas, Nashville, Tenn., and Augusta, Ga.

Business efficiency in employees is developed by kindness. Some men, seemingly unaware of this fact, go out of their way to humiliate a subordinate. In doing so they forfeit not only that man's respect, but on each occasion drown some of the vital spark of ambition in his breast.

ASPHALT SHINGLES SAVED THIS HOUSE.

DISASSEMBLED VIEW OF S. K. F. SELF-ALIGNING BALL BEARING, ASSEMBLED BEARING IN THE REAR.



S. K. F. SELF-ALIGNING BALL BEARING IN NORMAL AND DEFLECTED POSITIONS AND IN CROSS-SECTION.

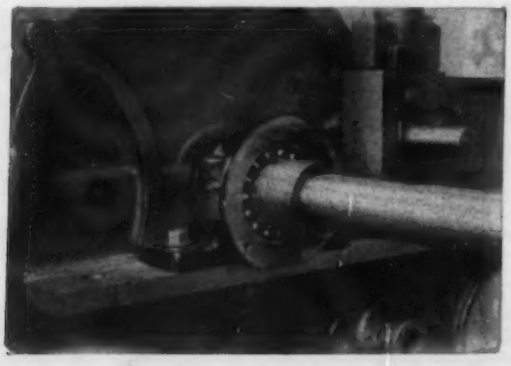
Ball Bearings on Machinery.

BY HORACE NILES TRUMBULL.*

The application of ball bearings to cotton machinery has been removed from the experimental stage to the realm of tried and proven practice; it is no longer a theory but a dollar and cents proposition, which progressive mill superintendents have been quick to grasp.

Ball bearings have been used extensively on beater shafts of cotton pickers since 1907. Numerous tests on pickers, openers and finishers equipped with ball bearings, show an average saving of ¾-horsepower per beater—in all cases the power saving has been in excess of half a horsepower, or over 10 per cent of the total power consumption.

Ball bearing picker boxes are leak-proof, therefore, the beater sides are clean and dry without their usual



A BEATER BOX WITH PLATE REMOVED, SHOWING BALL BEARING.

collection of oily fly. Most of the mills prefer to use grease for the ball bearing boxes, and add lubricant but once a month. For ten-hour-a-day service, 10 pounds of good neutral grease will supply one pair of beater boxes for a year, which means much in the saving of labor and upkeep costs.

Insofar as the mill superintendent is concerned, one of the most important features in the use of ball bearings is the ease with which the change-over can be made from the plain bearing beaters which are in use to the ball bearing type. No machine work whatever is required at the mill, unless the shaft has been badly worn. A ball bearing box is made to replace any type of plain bearing box, and the type of ball bearing furnished is adaptable to shaft sizes already in use. By slipping the tapered collar and ball bearing over the beater shaft to its desired position and tightening the lock-nut, the ball bearing and collar are secured to the shaft and rotate with it.

Ball bearings have been used extensively on the fan shaft of pickers, where the question of power saving on fan shafts is overshadowed by the other advantages gained. The absolute cleanliness about the box, prevention of bearing and shaft wear and the marked saving in lubrication are of prime importance.

Old-style Creighton type cotton oppeners have been in use and favorably regarded for many years; but trouble has been found almost invariably in the step thrust bearings of the vertical spindle. It was hard to get at this bearing to lubricate it; hence it was frequently neglected; it heated up easily on account of the speed, and it quickly wore down. Water cooling was frequently resorted to with some success; but the only practical solution came with the application of ball bearings.

The Saco-Lowell shops have designed and built their new type vertical openers, incorporating the use of S. K. F. ball bearings throughout.

The application of ball bearings to the main cylinder of cards was the first introduced by the German card builders, and there are a number of these ball-bearing cards to be found in this country. The particular feature of absolute cleanliness in the boxes (which are very similar to beater boxes) and the maintained accuracy of ball bearings, together with the ease of the starting the card cylinder has brought this application to the stage where it is a recognized success.

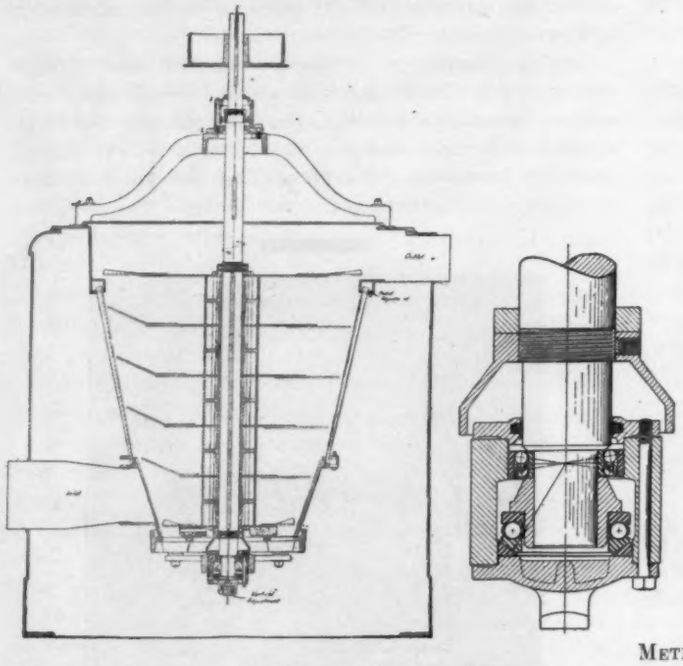
On account of the cleanliness of ball bearing boxes, the card clothing is not subject to destruction from oil saturation. Also cleaner stock and longer life of belts are assured. Card cylinders mounted on ball bearings are easily cleaned. This is because the cylinders are easily turned by hand. When the operator combs a card cylinder that is ball-bearing equipped, he does the job quickly and without assistance.

If the eccentric of the comb box revolves so that there is play between the eccentric and the arms, more trouble can be given by the comb boxes than any other part of the card. The doffer comb eccentric revolves at a very high speed, and when play exists a second vibration is set up, then it is merely a matter of time before the comb-posts, that hold the blade of the comb loosen, with the result that the doffer comb is allowed to come in contact with the wire on the doffer, and also the teeth of

*S. K. F. Ball Bearing Co., Hartford, Conn

the comb. All experienced carders know the trouble a comb in such a condition will give, and that it takes hours of patient use of pumice stone to smooth the injured places. By the use of ball bearings, wear is eliminated and the arms hug the eccentric so that there is no second vibration. The advantages of a comb box operating in this manner are appreciated by every carder.

Among improvements to keep half laps clean and remove oil, fly and dust from comber brushes and needles, the use of aspirators has performed an important function. Essentially a mechanism consisting of a small fan placed underneath the headstock of the comber and driven from the flywheel of the comber, the aspirator depends for its utility upon freedom from attention and lightness of running. The fan runs at approximately 1,000 revolutions



SECTIONAL VIEWS OF A VERTICAL OPENER, SHOWING THE BALL BEARING MOUNTING ARRANGEMENT.

per minute, and creates vacuum, which takes the noils off the brush and carries them to perforated drums. The fan shaft is mounted on ball bearings, which require very little attention and operate with the least power consumption.

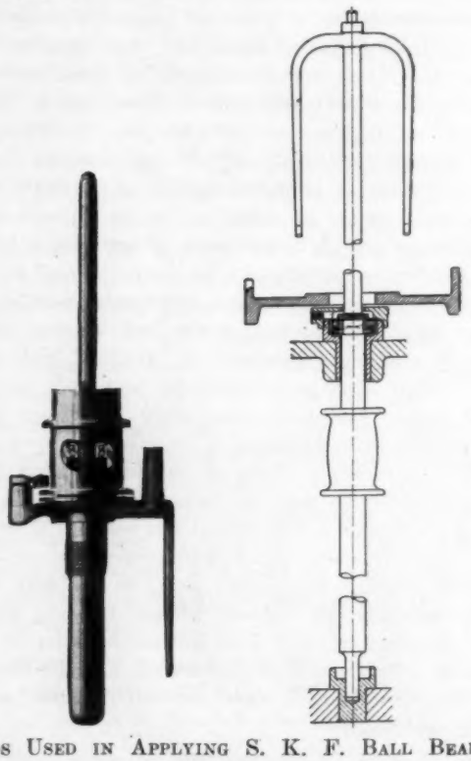
The English cotton machinery manufacturers have been the pioneers in developing ball bearing applications to the cylinder shafts on spinning and twisting frames. A set of tight bands will increase the power consumption about 15 per cent with plain bearings and, consequently, slow down the production. This is not possible with ball bearings. Further, the lubricant often becomes set or squeezed out of the plain cylinder bearings from the week-end shut-downs, and the starting load is often terrific, especially with tight driving belts and small pulleys.

The following are extracts from tests on motor-driven ring spinning frames. Each frame was identical, spinning the same yarn at the same time and with the power consumed by the driving motor itself deducted in all cases, giving exact net horsepower required to drive the frame itself:

472 Spindles, 2 1/5-inch Gauge, No. 33's Yarn.

Cylinder Speed. R.p.m.	Spindle Speed. R.p.m.	Plain Cyl. Brgs. Horsepower.	Ball Bearings. Horsepower.	Power Saved. Horsepower.
790	8,500	4.90	4.38	.52
870	9,300	7.17	6.24	.93
1,000	10,800	10.62	9.12	1.50

This shows savings varying from 10 per cent to 15 per cent of the net power and also proves that as the speeds are increased so are the power savings. The other test was as follows:



METHODS USED IN APPLYING S. K. F. BALL BEARINGS TO TWISTER SPINDLES.

364 Spindles on No. 24's Yarn.

	Cylinder. Motor Speed. R.p.m.	Cylinder Speed. R.p.m.	Spindle Speed. R.p.m.	Power Consumed. Horsepower.	No. of Spindles to 1 Horsepower.
Plain bearings	1,300	820	8,220	4.133	88
Ball bearings.	1,320	840	8,380	3.906	93

which shows, by the use of ball bearings, an increase of spindle speed of 150 revolutions, or about 2 per cent increase in production, and at the same time a power saving of .227 horsepower, or 5½ per cent of the total power.

Ball bearing twister spindles, because of their easy driving, will produce yarn of uniform and full theoretical twist, and in many cases the calculated twist may be less than that required by plain bearing spindles. On account of the lighter running of the ball-bearing spindles, there is a decided reduction in slippage of belts and bands, therefore, higher spindle speed may be obtained, giving greater production, less breakage, stronger and more uniform yarn.

Yarn taken from ball-bearing spindle twisters will make

a fabric of higher average tensile strength than that from plain bearing band drive twisters. The fabric will test to a more uniform tensile strength, and thereby fewer rejections or seconds need be made. In mills operating old band drive twister spindles this feature of uniform quality of product is alone worth the investment in ball-bearing twister spindles.

The prime advantage of using ball bearing twister spindles is the power saving. Tests have been made on spindles alone and records of 30 to 33 per cent power saving were shown. Under operating conditions in the mill, because of the friction losses, through the entire frame, the total savings net 12 to 18 per cent.

The cost of an S. K. F. ball bearing twister spindle is approximately 50 to 85 per cent greater than that of a plain bearing spindle of equal size, but considering one feature alone, i. e., power saving, it has been proved that the added investment will yield a return of at least 20 per cent annually, or over 400 per cent during the life of the spindle; this does not take into account the very essential feature of improved quality of product, as previously mentioned. Also the savings in oil and maintenance charges are additional items of importance in favor of the ball-bearing spindle.

A mechanically durable and commercial practical ball-bearing spindle demands that the ball bearing must be accurately made to withstand the wear of high spindle speeds, and it must be self-aligning to permit of proper spindle play. The illustrations show the design of two types of successful ball-bearing spindles. A very important feature is the position of the ball bearing relative to the whorl, which tends to balance the pull and relieve the step bearing of practically all side strains. This means that the spindle blade should, with proper care of lubrication and cleaning, last indefinitely, as the ball bearing can, if necessary, be replaced without harming any part of the complete spindle. Ball bearing spindles should be oiled with a light grade of machine oil, and the amount of good machine oil used is about one-half that used on plain bearing spindles.

The adoption of ball bearings on cylinder slashers is similar to their use on the large drying cylinder in the paper trade. To textile men the condition to be found where cylinder slashers are equipped with trunnion bearings are well known. After the cylinder (which weighs over 2,000 pounds) has been used for some time the trunnions wear down, the journals become grooved and sometimes the cylinders cease to revolve. The tension on the warp is naturally increased, and the slasher tender must be particularly careful to start the slasher slowly, which cuts down the production of the machine. Ball bearings are desirable for slasher cylinders, being easily started from rest, and the tension on the warp is decidedly reduced, thus saving in power, and increased production makes the adoption of ball bearings profitable. The fact that rolling substituted rubbing friction in the bearing minimizes the friction and insures long life of the bearings.

The package spindles of ball bearing winders of recent design are mounted on two small bearings, which are completely enclosed in leak-proof housings.

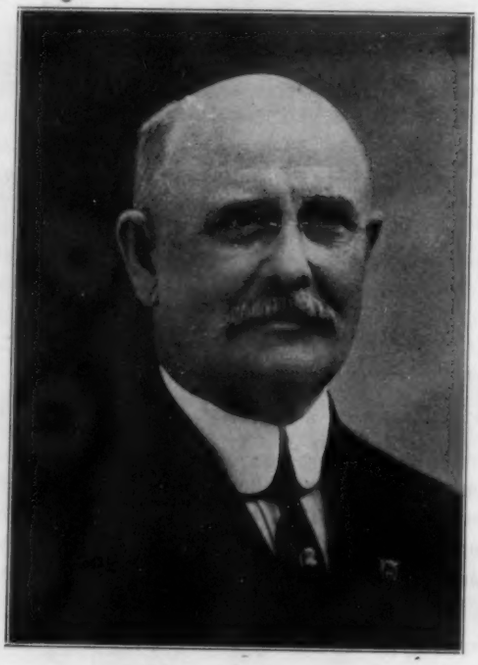
Ball bearings on looms means not only a saving in power required to drive the machine, but also a saving in oil. The bearing housings seal the oil chambers against leakage of oil and the entrance of lint or grit into the bearing. This means the elimination of oil stained goods and seconds. A bad fitting crank shaft is the source of most lubrication trouble, and if the bearing can be made more accurate and the bearing housings sealed against leakage, we have solved the features usually so difficult to remedy.

On direct-connected motor looms ball bearings have helped solve the starting difficulty by reducing the starting torque of the loom over 50 per cent.

In general, the value of ball bearings for textile mills is the efficiency developed, i. e., ball bearings, have helped to make textile machinery and appliances faster and better producers or greater earners. This increased efficiency includes: (*a*) power savings; (*b*) economies in equipment, in maintenance, in lubrication and attendance; (*c*) advantages in production.

Mills operated by steam or electric power can save on their coal or current bills by using ball-bearing machinery —"Power is money."

Ball bearings help to produce steadier running machinery, which allows higher speeds to be maintained and increased production obtained. Steadier running also helps to produce a more uniform and better product; this is especially true with cotton preparing and spinning machinery.



SCOTT MAXWELL.
BORN IN WEBSTER, MAINE, JULY 8, 1855.
DIED IN DOVER, NEW HAMPSHIRE, NOV. 4, 1916.

From rugged New England he came to us; to New England he has returned. Behind him lies a path strewn with friendly faces and good deeds. As a manufacturer he was successful; as an individual he earned and received the love and respect of his fellowmen. Generous to a fault, thoughtful of others, honest with himself, he stood four-square with the world, and as he passes on to the Great Beyond, a multitude of friends and co-workers stand with uncovered heads and reverently murmur—"There goes a Man."

Mill Conditions and Market Reviews.

Southern Mill Situation.

The past month among the southern mills has been notable for the almost universal increase in wages over the entire South. Mill after mill has made announcement of an increase in wages, usually amounting to around 10 per cent. One group of mills gave in addition to the ten per cent raise a bonus of one week's pay.

The strike situation at Anderson, S. C., where two mills have been closed since September first, because of striking operatives and the refusal on the part of county officers to enforce the law and protect the property interests of the company, has at last been adequately settled by several companies of state militia ordered to Anderson by Governor Manning, and under military protection the civil laws were enforced and the two mills in question started running with reduced operating forces. It is locally rumored that a number of the striking families have gone to mills in New York and New England where they have secured work.

The reorganization plans for the Graniteville Manufacturing Co., of Graniteville, S. C., are going on apace. Two different plans are under consideration and will be presented to the stockholders in due time, neither of which contemplates the sale of the property, but rather the payment of outstanding indebtedness and the conserving of the property for the stockholders.

Approximately one year ago the Graniteville Mills, with debts aggregating one million dollars, were placed in the hands of two receivers—Jacob Phinizy of Augusta, and R. G. Rhett, of Charleston, S. C. These receivers after making some changes in the executive management of the mills, placed Frank W. Gurry in active charge of the manufacturing end as superintendent for the receivers. Under the co-receivership, 6 per cent interest has been paid on the debt and 10 per cent on the principal, these funds being realized from the operation of the mills by the receivers.

A plan has now been devised by J. W. Dickey, of Augusta, Ga.; Robinson-Humphries-Wardlaw Co., of Atlanta, Ga.; Citizens and Southern Bank of Savannah, Ga.; the Central Bank and Trust Company of Atlanta, Ga.; and W. M. Davis Company, of Macon, Ga., who propose to accept security from the company in the form of first mortgage bonds to the amount of $500,000 at 7 per cent, and who also agree to purchase $200,000 of preferred stock at 7 per cent, receiving therewith a bonus of $150,000 of common stock. This would provide in cash $650,000 and would lack approximately $200,000 of paying off all indebtedness, which latter amount it is believed could be arranged among friendly creditors. This plan has already been underwritten and the proposers stand ready to consummate the transaction just as soon as it shall be approved by the stockholders.

Another plan proposed is that of H. M. Dibble of the National Bank of Aiken, S. C., who claims to represent interests who will purchase $600,000 of first mortgage bonds at par bearing interest at 6 per cent and also discount $300,000 of the company's 6 per cent notes. This would provide $900,000 in cash, a sum sufficient to pay off all indebtedness of the corporation, leaving the funds now on hand as an operating capital. Mr. Dibble's plan contemplates that he and his associates are to receive a bonus of $150,000 of preferred stock bearing 6 per cent interest subject to sale after the payment of bonds and notes or just as soon as the common stockholders wish to resume control of the property.

Both these plans provide that the common stock shall be pooled and the affairs of the mill managed, until the bonds should be retired, by five trustees, three of whom shall be chosen by the preferred stockholders and two by the common stockholders.

The petition of the stockholders to the United States Court for permission to continue the operation of the mills under the co-receivership until the last of May was granted by Judge Henry A. M. Smith at a hearing in Columbia. The court authorized the receivers to purchase cotton and sell the manufactured products of the mills until the date above mentioned. In granting the petition, Judge Smith let it be known that the court was pleased with the conduct of the mills under the direction of the receivers.

In the recent re-organization of the Dixie Cotton Mills at LaGrange, Ga., all the old stockholders in the mill have been given stock in the new organization to the value of their old stock and the sale and re-organization was effected by unanimous consent of all the stockholders. Although the mill was re-organized, it is under the same management, and the prospects for the mill is brighter now than it has been for several years.

Another addition to the Meritas Mills at Columbus, Ga., has been decided upon and a contract has been awarded to T. C. Thompson & Bro., of Charlotte, N. C., for the construction of the building. The machinery installed will be 350 wide looms and will be driven by electric power.

The Hampton Department of the Pacific Mills, with four plants located at Columbia, S. C., are spending a great deal of money in betterment work around the mill plants. This is in an effort to improve the living conditions of the operatives by providing better homes and more conveniences. In addition to this, the mill buildings are being thoroughly painted and cleaned up; department overseer's offices are being built on elevated platforms in the various rooms to better facilitate their work; and intercommunicating telephones are to be installed so that every department head will be in close and immediate touch with the general superintendent's office at all times.

Among other changes that are being made among these mills are the toilet arrangements, which are being remodeled. A new drinking water system is being installed in all of the buildings and new roofs are being placed on the Richland and Granby Mills. The lighting system in the Capitol City and Richland Mills is also being improved. Practically all of the houses occupied by the mill operatives are being painted, except those which were erected last year. Old machinery in the mills is being replaced by new and improved types. A new kindergarten has recently been started

and the Y. M. C. A. building will be re-opened within a few days, thoroughly renovated and equipped with new furnishings.

General Manager Irving Southworth of these mills recently announced a general re-adjustment of wages, which means an increase in pay for the operatives in some of the departments.

The Cement Products Company, of Wilmington, N. C., manufacturers of the Sanisep portable concrete sewerage disposal tanks, have located a branch factory at East Point, Ga., having leased what is known as the "old stone jug factory" for this purpose. The greatly increased business in Georgia and Alabama has necessitated this step, as the company found it impossible to ship all their products from the Wilmington factory.

The I. V. Sutphin Co., of Cincinnati, Ohio, opened a waste paper warehouse at 310 Marietta Street, Atlanta, on December first. They are handling all kinds of waste paper from the cotton and knitting mills.

One of the new organizations which has attracted considerable attention in cotton mill circles is the Papco Paper Products Co., Atlanta, Ga. They are direct mill representatives and have connections of the highest order. The concern specializes on gummed paper products of all kinds, including gummed paper in rolls, shipping labels in rolls, stickers, non-seals for parcel post shipments and moistening machines.

Of special interest to the cotton mills is their specially prepared slasher tape for slashing machines. After a series of experiments running over a long period they have developed what is believed to be the most satisfactory tape for the purpose it is possible to produce. In connection with this tape they are introducing their new Papco moistening machine which is not only clever in design but efficient in service. Ample stock is carried to meet all demands quickly and the rapid success of the company seems assured. F. B. Ludwig is president and J. R. Regnas is secretary and treasurer. Mr. Regnas who is Southern manager of the Acme Steel Goods Co., Atlanta, is well known in cotton mill circles and both men stand high in the business world.

Under the supervision of Mill Architect J. E. Sirrine, of Greenville, S. C., the Courtenay Manufacturing Co., of Newry, S. C., is tearing out all of the plain bearing transmission equipment of its mill and is substituting self-aligning ball bearing hangers and pillow blocks throughout the plant. The S K F Ball Bearing Co., of Hartford, Connecticut, has been awarded the contract for this new equipment. The order is the largest ever placed in the United States for ball bearing hangers and pillow blocks to be installed in one mill and was placed through the Atlanta, Ga., office of the S K F company, of which F. V. L. Smith is in charge. Many of the bearings required for this installation are of sizes not yet being made at the Hartford factory and are being imported from the parent factory of the company at Gothenburg, Sweden. The bearing sizes in this equipment range from 6 inch shaft down to 1 11/16 inch shaft; the weight of the largest pillow block being 650 pounds and the smallest hanger 15 pounds.

The Cedartown Cotton and Export Company at Cedartown, Ga., have just finished placing the last of their new machinery in the additional buildings recently constructed. The main mill structure is 228 feet wide by 330 feet long, which is in addition to the No. 2 mill, which is a two-story structure. These mills are provided with sanitary drinking fountains and are largely operated by electric power, something like 800 horsepower being supplied by the Georgia Railway and Power Company.

A movement for the establishment of a cotton mill at La Fayette, Ala., was begun at a recent mass meeting of citizens. B. S. Moon and J. D. Norman are among the organization committee.

The Cook Duck Mills recently organized at Cedartown, Ga., have selected as officials Edward Cook, president; George Beveridge, vice-president; William Parker, Jr., secretary and treasurer. The company has already secured the building and will soon be in operation.

The Fort Mill (S. C.) Mfg. Co. has awarded a contract for an addition to its No. 1 mill which will contain 850 gingham looms.

The Thread Mills Company, at Spray, N. C., will install electric drive in its eleven cotton mills. Contract has been awarded for the machinery and its installation to the Westinghouse Electric & Mfg. Company.

The Mutual Cotton Mills Company, Gastonia, N. C., has been incorporated with a capital stock of $200,000, by C. B. Armstrong and associates. A 6,000 spindle yarn mill will be built.

The Seminole Cotton Mills at Clear Water, S. C., will build additional operatives' cottages in the near future.

The Aiken Manufacturing Co., at Bath, S. C., will add ten operatives' cottages at an early date.

The Langley (S. C.) Manufacturing Co., have recently purchased an oxy-acetylene welding outfit of the Bird-Wilcox type.

The Florence Mills at Forrest City, N. C., are adding eight new operatives' cottages to their village.

The Thomaston (Ga.) Cotton Mills have let a contract for a new addition to contain 10,000 spindles.

Contracts for lighting the mill villages of the Baldwin and Springstein Mills at Chester, S. C., have been placed with Huntingdon and Guerry, electrical contractors at Greenville, S. C.

The Abingdon Mills at Huntsville, Ala., have just completed the second addition to their mill for 1916. Machinery will be placed in this addition at an early date.

Contracts have been let for the No. 2 mill of the Clinchfield Mfg. Co.'s plant at Marion, N. C. This will contain 40,000 spindles and 1,000 looms.

Spinning machinery to equip a 2,000 spindle plant at Bowling Green, S. C., has been ordered by W. G. Reynolds, treasurer of the Dorothy Manufacturing Co., at Dallas, N. C. This machinery will be installed in the building formerly used by the Bowling Green Knitting Mills. This plant is expected to be in operation by February.

The Monaghan Mills Co., of Greenville, S. C., is erecting twelve four-room cottages in their mill village.

R. M. Miller, Jr., and the associated stock holders have sold the Elizabeth Mill, Inc., of Charlotte, to W. C. Wilkinson, of Charlotte, and C. B. Armstrong and A. G. Myers, of Gastonia. The transfer will become effective January 4th, when Mr. Miller will relinquish control and the new owners will take it over. The plant has an equipment of nearly 12,000 spindles and make a specialty of fine yarns. It is understood the consideration will approximate $250,000.

New England Mill Situation.

While the results of the national election were disappointing to New England cotton manufacturers they are hoping that something will come out of the work of the new Tariff Commission to provide means for re-adjusting the cotton schedules if after-war developments threaten any large influx of cheap foreign products. Those of them interested in the political phases of the contest were surprised by the defeat of Senator Lippitt of Rhode Island, who was regarded as a direct representative of cotton mill interests in the national capital.

New cloth orders in November were lighter than those of October yet it was astonishing to note how many buyers were ready to make late committments at the very high prices that are ruling. Efforts to check buying have been very general and have not been disguised. Several of the mills prefer to have shorter term contracts on their books than they now have and there is a very general desire expressed to have buyers purchase staple goods as they require them rather than to have large forward orders placed and have them imperilled by any of several developments that are possible in war times.

The Fall River manufacturers have agreed to advance wages 10 per cent, beginning December 4, the advance to hold for six months. The Rhode Island manufacturers have taken similar action, and at this time it is believed that general wage advances in all textile lines will occur before the end of the year. The price for print cloth weaving will be 27.5 cents per cut of 46 yards of 28 inch 64x64 print cloths, which is 4 cents per yard higher than any wage scale in 40 years. Corresponding advances will be made in all other mill departments. The wages that will be paid for carding room help will be slightly above the parity in other sections owing to the urgent demand for labor of this sort.

If wage advances were all that manufacturers had to contend with they would have made the last increase with better grace. Because of the scarcity of labor their hands were forced. There have been many other substantial increases made in the costs of production aside from wages, and many of them are so drastic that they have a direct effect upon cloth prices. Coal is up about 100 per cent from the low point, all leather supplies are up two and three fold, all the steel supplies are up, potato starch and corn starch are up, and in fact all the details of supplies are so high that they constitute a factor of large importance in reckoning costs for the future.

Most of the New England manufacturers accepted 20 cent cotton as a probability some weeks ago, and they prepared for it by urging higher cloth prices upon agents at a time when buyers were inclined to operate. In consequence of many of the large cloth purchases, mills were forced to cover on raw material so that purchases for future use have been quite in keeping with the active cloth business. The consumption of cotton promises to be larger than a year ago because of the marked trend to the production of heavier goods. In so far as the next six months' trade is concerned, there is but one opinion held and that is that it will remain prosperous provided some untoward event arising from war does not intervene.

One of the significant features of the month in a manufacturing way was the advance in cotton mill machinery. Automatic looms were advanced 20 per cent, the first advances made since the war started. Manufacturers of weaving machinery exhausted their cheap raw materials before entering on to higher price levels, but now that a change of basis has been made it is predicted that others will follow quickly owing to the enormous advances secured in metal trades, and in labor circles. All the machinery concerns have as much business as they care for, some of them actually having all they need for 1917.

The rise in cloth prices since the last reports has been less spectacular but quite as general. Wide 64x60 print cloths have sold at 8⅛c, ⅜c up; standard drills have sold at 12c, 1¼c up; standard 4-4 bleached muslins are up 1¼c a yard; shirting chambrays are up another 1c a yard; dress ginghams are up another 1c a yard to a basis of 11½c for Amoskeag Utilities; staple tickings are up 2c a yard to a basis of 19½c for 8 oz. goods, and so on through a long list of branded and unbranded merchandise. Yarns have gone to price levels that are purely nominal in a great part of the list, largely because mills have so much business that they cannot take more and guarantee a reasonable delivery.

The price basis for the initial orders on fancy domestics for the manufacturing trades is 65 per cent higher than a year ago. For a cloth that cost 7½c, a price of 12½c has been paid. For dark and solid colors, a higher basis prevails. The napped goods mills, such as the Appleton, Tremont & Suffolk, and Amoskeag, will be unable to produce anything like a normal volume of goods to be sold for next fall owing to the very large overflow business that has come in at the end of this season. The exports of napped cottons has also been very large and this feature accounts in part for the acute scarcity in some lines for immediate distribution. Narrow goods for the jobbing trades are not to be priced much before the turn of the year and they will certainly cost as much as the wide goods.

The cotton blanket mills are very short of stocks for any delivery this side of February. Such a condition has never been known before among the larger mills. Usually there are stocks held in warehouse for customers but this season the movement has been so broad that neither jobbers nor mills are burdened with anything in the way of surplus goods. Here again, the export trade has been a feature that has affected the abundance of domestic supplies.

Stocks of print cloths at Fall River have dwindled until less than a week's output of all sorts of goods is being carried in warehouses. It is more than ten years since Fall River stocks were so low. The sold up conditions of the mills at that centre are the more remarkable when it is recalled that manufacturers have held back on contracts even when very fancy prices were being offered. For January the mills are engaged to deliver 170,000 pieces weekly, the largest forward sales known at Fall River for many years. Many narrow print cloths of thin construction have sold above 45c per pound, while some of the cloths made for covering tobacco plants and for bandage purposes have sold at 51c per pound.

Fine combed yarn goods are quoted on a basis of 14¾c for 7-yard 96x100's, and 12½c for 40-inch 88x80's. All New Bedford mills have an abundance of choice business and can pick and choose between contracts. The advance sales of fine wash fabrics to the retail trade has been the largest known in more than ten years and converters and others are having difficulty in getting duplicate mill orders accepted. There is less desire manifested to take business

on fine and high novelties as operatives are indifferent about working on the more intricate cloths when plain weaving at good prices is so abundant. There has been a broadening in the demand for heavy fine cotton goods for skirtings and for dress wear, poplins, gabardines, fine and fancy oxfords and cheviots, and a variety of striped heavy fancies being called for.

All things point now to a much larger business in dress ginghams and in other colored goods, despite the high prices. Some of the large jobbers sold out their stocks of goods of this class at very low prices early this year and are now finding that mills will not replace them unless they are paid for the added high costs that have come in the interval. A number of jobbers who bought dress ginghams for spring at 9c are now paying 11c for duplicate orders in 50 case lots.

Hope 4-4 bleached cottons have reached the unparalleled price level of 10½c a yard. The last half cent was added to the price by mill agents following a notice sent out to retailers by Marshall Field & Co., quoting these goods at 9¼c. This action on the part of the largest Western jobbing house would have unsettled the primary markets in normal times, but with collections good, cotton high, labor advancing, and stocks in first hands at a minimum level, manufacturers see no reason for making price concessions to meet a jobbers' holiday. That a jobbing price concession at this period may prove healthy in the long run of trade is not doubted, for it is well known that many western retailers have been making late committments for goods in a reckless way. But when it comes to the unsettling of a market as strong as the present cotton goods market seems to be, manufacturers and primary merchants say something more than a jobbers' price will have to be the instrument used.

The miscellaneous lines of cotton goods are still active in New England. Knit goods for fall have opened at price advances ranging from 40 to 50 per cent over last year and orders are coming in very well indeed. The hosiery mills have more business in hand than they can complete in four months. The webbing mills are exceedingly busy. Tire fabric mills have orders in hand that run into 1918. The narrow fabric mills are very busy, hampered considerably by the high prices asked for yarns, but complaining of no difficulty in selling anything they can produce.

Bleaching and finishing plants are running as full as restricted supplies of labor will permit. The large printers are running in full and are completing the greatest year in production they have ever known. It is hardly necessary to point out that the showings of earnings made to stockholders in the past month have been exceedingly gratifying in all lines of textile enterprises in this section, and the interest in mill shares is greater than it has been since 1907.

F. B. Gleason, formerly in charge of the Western Electric Company's business in the Far East, with headquarters at Tokio, Japan, has been appointed manager of the Southern District of the Western Electric Company, with headquarters at Atlanta, Georgia. He will succeed E. J. Wallis, who, on January 1st, will take up his new work as manager of the Pacific Coast District, with headquarters at San Francisco. Mr. Wallis will succeed F. H. Leggett, who, after three years on the Coast, returns to the company's executive offices at 195 Broadway, New York City.

Lancashire Notes.

BY AN ENGLISH CORRESPONDENT.

A serious matter for the trade is the decision of the Army authorities to rigorously revise the lists of exemptions from military service. In the cotton trade all married spinners and piecers and all those who are single and above the age of 30 are now in a reserved occupation; that is, they cannot be drawn upon by the military authorities; and the same thing applies to the principal workers in all departments of the mills. These occupations were placed on the reserved list not a week too soon; indeed, only when the trade had suffered severely by enlistments; and the possibility of some of them now being struck off is regarded with dismay by employers throughout the industry. Yet this is a possibility of the near future and conferences on the matter have already taken place between representatives of the trade and the government. In addition to curtailing the list of reserved occupations, the list of exemptions obtained from the service tribunals will be strictly revised before long. The withdrawal of any more labor from the trade will probably mean that some mills will have to stop. It is difficult to estimate the amount of machinery which is already stopped for lack of labor, for it varies greatly from mill to mill and from district to district. It is variously placed at from 10 to 20 per cent. An important factor in the situation, however, is that much of the machinery that is kept running is under-staffed. In the mule-rooms this, in many cases, is meaning a great strain on the spinners, who are making considerable complaint; and it drives labor from the trade into less arduous occupations.

It was reported to the recent meeting of the Council of the British Cotton Growing Association that in Nyasaland the acreage under cotton grown by Europeans was the largest yet planted in the Protectorate, namely, 29,578 acres as compared with 24,006 last year. Low temperatures in March have, however, seriously reduced the prospects of the crop in the highlands and the Luchenza crop has been severely attacked by insects. On the Lower River, the prospects are considerably above the average and show a marked improvement on last year. Allowing, however, for good crops in this area, the output per acre for the total European acreage is likely to be below the average. The distribution of seeds to the natives was never larger than in the present season, and as the greater part of the native crop is grown in the warmer districts, it has not suffered to the same extent as the European crop in the highlands. It is expected that the native crop will give a total somewhat similar to that of 1913-1914 when the record crop of 1198 tons of seed cotton was harvested. Such a result would be considered especially satisfactory in view of the great demands on native Agricultural Department for the supervision of the crop.

The annual report of British Dyes, Ltd., the state-supported concern founded with the idea of making this country independent of foreign dyes, shows that, on the date of the statutory meeting held last year, the subscribed capital and the loan capital which the company was entitled to receive from the government amounted to £1,512,198. At the close of the year, April 30, 1916, the capital stood at £1,851,914, an increase of £339,116. The capital now

stands at £1,976,342, making a total increase between June last year and October 12th this year of £464,144. The chairman told the annual meeting that he considered the increase of capital very gratifying and an indication that the company was winning people's confidence. He mentioned that "very substantial" subscriptions were coming in from India, Canada and Australia, which showed "that not in this country only but throughout the empire the effort to establish a supply of dyes was meeting with large support." The profit and loss account for the year showed a balance to the good of £65,982 after providing £200,000 for increased cost of construction during the war, depreciation and obsolescence of buildings and plant. Touching the subject of dyes, it may be mentioned here that the new department at Manchester University for advanced training and research in connection with the dyestuffs industry is now open. It will be available for all post-graduate students whether trained in Manchester University or in other chemical schools of the country. Professor A. G. Green, who has carried out important researches in the dyestuffs industry at Leeds University, is in charge of the new department.

Some time ago Lord Edward Cecil, Adviser to the Minister of Finance at Cairo, urged upon the Manchester Cotton Association the importance of British firms being founded in the Egyptian cotton trade to take the place of enemy firms which have been liquidated. The Manchester association did not consider the matter as one of very great moment; so Sir Edward has returned to the charge in the columns of "The Times." He points out that the cotton exported by German and Austrian firms in Egypt in the season of 1913-1914 totalled 274,439 bales, of which only 92,240 went to England. Of the total export during the same period ten German houses exported 28 per cent, which represented a value of about £7,500,000 out of a value of £26,357,000. "With these facts before us," Lord Edward wrote, "it is difficult to understand how the Manchester Cotton Association can consider the cotton business previously transacted with England as 'small.'" Other countries," said Lord Edward, "do not share the opinion of the Manchester Cotton Association, for since the liquidation of enemy firms two Greek and two Jewish firms have been set on foot. It is true that out of a total export of 970,263 bales in the season 1913-1914 the British firms exported 292,916, but he argues it is not safe to assume that the four British firms now established in Egypt can absorb the trade relinquished by enemy concerns; and the Manchester Association would have been well advised in making a searching enquiry before hazarding an opinion which to people on the spot savors decidedly of a temerity based on insufficient knowledge."

At the autumnal congress of the Textile Institute the need for more research work in connection with British textile industries was the predominant topic. In a paper on "Textile Research," J. H. Lester, of the Manchaster Testing House, said it was clearly their duty to speed up any machinery already existing for research, and to formulate the requirements of the industry. There was the greatest danger of disaster for any scheme of research which aimed at patented processes, or immediate results of great industrial value. Industrial research of lasting value could only be built up on a basis of countless pure or fundamental reasearches, and upon the experience of many failures.

Cotton Comment.

BY H. AND B. BEER.

New Orleans, Nov. 14th, 1916.

Since our last monthly review the market experienced a reaction of about 150 points, but as spots failed to give way to any considerable extent, and as there was a tendency to reduce crop estimates and no abatement in the trade demand, new high levels for the season were recorded today.

Indications are that American mills will consume about 8,000,000 bales this season vs. 7,277,000 last season and 6,010,000 season before last, as, according to the Census Bureau, consumption in the United States during October was 622,000 bales against 578,000 for the corresponding month last year, making a total of 1,843,000 bales for the first three months of the season vs. 1,670,000 for the corresponding period last season.

Liverpool has displayed unmistakable signs of strength the past week, in fact throughout the season, as Europe is very much concerned regarding the enormous consumption of cotton in the United States.

The smaller private crop estimates of late has added to the bullishness of the situation, as Europe needs at least 7,000,000 bales of American this season.

That being the case, and as America requires about 8,000,000 bales for home consumption, such a supply is not available from this year's crop even though it be 13,000,000 commercial and including the 1,508,000 bales carried over in the interior and at the U. S. ports at close of last season, which, in all would make 14,508,000 bales, as the world requirements at present point to about 15,000,000 bales.

American spinners appear to be alive to the situation and have been large buyers of the staple. Thus far this season, or since August 1st, Northern mills have taken 906,000 bales vs. 731,000 last year, Southern mills 1,162,000 against 947,000. Considering the high prices prevailing, Europe has taken liberally also, but somewhat smaller than last year, 1,706,000 vs. 2,024,000. Total by the world, 3,774,000 vs. 3,702,000.

At the close of October, American mills held a stock of 1,723,000 against 1,346,000 on corresponding date last year, or about ten weeks' supply, but they have 9 months more to run before the season is over, and will be obliged to buy freely for some time to come in order to provide for future requirements to meet the big trade demand in sight.

Since Europe promises to consume as much, if not more cotton than they consumed last season, and as they have taken less than last year to date, they must, of necessity, also buy largely for some time to come.

In view of the probability of cotton cornering itself by next summer, making possible higher prices later in the season, there is likely to continue a keen demand between European and American spinners for the unmarketed portion of this small crop.

Thus far this season the South has marketed about half of this year's production, linters not included, or 5,546,000 vs. 4,401,000 last year. In other words late estimates point to a yield, exclusive of linters, of about 11,000,000 bales. Therefore, as the quantity marketed is 1,146,000 larger than last year to date, it follows that there is less cotton in the interior by several hundred thousand bales than there was at this time one year ago.

This feature of the situation is noted in today's Census Bureau report placing the stock in public storage and in compresses on October 31st, at 3,673,000, last year 4,170,000, and it is generally claimed that there remains less cotton to be ginned than was ginned after this date last season, which can only add to the strength of the situation.

Exports from all ports to Europe thus far this season total 2,075,000 bales compared with 1,588,000 last year. To secure her full needs Europe will have to import 5,000,000 bales additional, but this can only be accomplished by competing with American mills for the balance of this crop, which, in the end, is likely to be reflected in much higher prices.

The Yarn Market.

The close of October showed a slowing up in the yarn market owing to the belief on the part of many buyers that prices were too high in comparison with other conditions. While there was a break in the raw cotton market during that period it had little effect on yarn prices.

The opening of November found every one more interested in the National election than in higher yarn prices, and it was difficult to get some manufacturers to listen to what yarn men had to say. This made a comparatively slow week for the first week in November, although prices on carded yarns on cones continued to climb higher and some spinners refused offers even at top prices. While the result of the election was depressing in most manufacturing quarters, still knitters did not hesitate about buying yarns. Neither did the election result seem to have any effect on yarn prices, as they continued to climb skyward. It is reported that an underwear manufacturer made an offer of 35 cents on a basis of 10's for 50,000 pounds of Southern frame spun cones, delivery to start in January, but the spinner refused to accept the contract. Early in the month there was a sale of 50,000 pounds of Southern frame spun 10's on cones made for 34½ cents and also a sale of 50,000 pounds of 14's on cones at 35½ cents, while 25,000 pounds of 16's cones brought 36 cents. These sales were for delivery to begin in December. Eastern mule spun carded yarns sold on the basis of 36 and 38 cents for 10's and toward the end of the week, dealers who had sold for 36 cents were quoting higher prices, one even quoting 39 cents on the basis of 10's.

Combed yarns remained strong under a moderate demand, with spinners' prices steadily advancing. Some Eastern spinners refused high prices for single combed yarns, as they could not make deliveries required. There were sales of two-ply in single combed peeler ranging from a few packages up to 50,000 pounds. Southern frame spun single combed peeler sold on a basis of 43 to 44 cents for 10's in the coarser numbers. Eastern mule spun 18's on cones sold for 47 and 48 cents and 20's sold for 47½ to 49 cents. 30's on cones brought 53 to 55 cents, and 60's splicing cones sold for 90 to 93 cents. Sales of two-ply were made at 51 to 53 cents for 20's; 64 to 66 cents for 30's; 70 for 36's; 75 to 78 cents for 40's; 88 to 90 cents for 50's, and 95 cents to $1.00 for 60's.

Carded weaving yarn continued in rather light demand with the spinners' prices well in advance of the market.

The yarn situation as the month closes is peculiar. It has probably no parallel in the history of the textile industry of the country. Every one is trying to forecast the future, and the majority change their opinion about once a week. A manufacturer who studies the situation from every angle and uses discretion in buying and selling, will probably be the one to glean the best results from the situation.

There is a good demand for single and ply combed yarn for spot delivery, but it does not include all numbers. Coarse numbers of single yarns, that is, up to 18's are reported to be rather slow. It is the intermediate numbers between 18's and 70's two-ply that are in the greatest demand. It is reported in the South that some spinners have been paid as high as $1.10 for 60's two-ply combed peeler. Some quantities of 60's two-ply combed peeler warp, mercerizing twist, were made for 95 to 98 cents; 5,000 to 50,000 pounds for future deliveries were made for $1.00. Sales for 50's two-ply combed peeler were made for 89 and 90 cents; 40's two-ply are bringing 77 and 78 cents. Carded yarns on cones are in good demand and the prices continue to rise slowly.

Following are recent quotations in the Philadelphia market:

Southern Single Skeins.

8s	32 @32½	10s	32½ @33
12s	33 @33½	14s	34 @34½
16s	34½ @35	20s	35½ @36
24s	38½ @39	26s	38½ @39
30s	42 @43		

Southern Sngle Warps.

8s	32 @32½	10s	33 @33½
12s	33½ @34	13s	34½ @35
16s	35 @35½	20s	36 @36½
26s	39 @39½	30s	43 @43½
40s	54 @56		

Carpet and Upholstery Yarns in Skeins.

8-4 slack	31 @31½	9-4 slack	31½ @32
8-3-4 hard twist	30½ @31		

Southern Two-Ply Skeins.

8s	32½ @33	10s	33 @33½
12s	33½ @34	14s	34 @34½
16s	34½ @36	20s	39½ @40
24s	39½ @40	26s	40 @40½
30s	43 @43½	40s	54 @58
50s	65 @67	60s	74 @75

Southern Two-Ply Warps.

8s	32½ @33	10s	33 @33½
12s	33½ @34	14s	35 @35½
16s	36 @36½	20s	39½ @40
24s	38½ @40	30s	43 @44
40s	54 @61	50s	67 @69

Northern Two-Ply Carded Peeler Skeins.

20s	40 @40½	24s	42 @43
26s	43 @44	30s	46 @47
36s	51 @52	40s	60 @61
50s	69 @70		

Two-Ply Combed Peeler Skeins.

20s	52 @53	24s	56 @58
30s	67 @68	40s	77 @79
50s	90	60s	98 @1.00
70s	1.10 @1.12	80s	1.25 @1.30

Southern Frame Spun Yarn on Cones.

8s	38 @38½	10s	36½ @37
12s	37 @37½	14s	37½ @38
16s	38 @38½	18s	38½ @39
20s	39 @39½	22s	39½ @40
24s	40½ @41	26s	41½ @42
30s	45 @47	40s	55 @56

Northern Mule Spun Carded Yarn on Cones.

10s	38 @38½	12s	38¼ @39
14s	39 @39½	16s	39½ @40
18s	40 @40½	20s	40½ @41
24s	42 @42½	26s	42½ @43
30s	47 @50	40s	65 @66

Northern Mule Spun Combed Peeler Yarn on Cones.

10s	47½ @48	12s	48 @48½
14s	48½ @49	16s	49 @49½
18s	50 @50½	20s	50½ @51
22s	51 @51½	26s	54 @55
30s	58 @60	36s	64 @66
40s	72 @74		

COTTON MANUFACTURING.

Increasing Human Efficiency.

BY A. M. OLIVER.

Human efficiency is based upon principles. Get your principles right and the rest is a matter of detail. One of the principal things in business life is achievement. To attain success early it is necessary that we take the shortest cuts. To do this we must be efficient. We must select the best way, the quickest way and the easiest way. If we lose sight of the best way at any stage we immediately cease to be efficient and our results will be a hindrance rather than an advantage.

System doesn't mean efficiency. Every man and woman, every retailer and wholesaler, every small factory and large industrial plant has a system. But every system is not by any means an efficient system. Some systems are a mass of card files and indexes and some systems are so intricate that no single accessory to the fact could explain the entire system.

"There is but one easiest way, and there can be but one quickest way," says Emerson. The easiest way that was not the best way, or the quickest way that was not the best way, would be useless. It is the easiest way, to make a pay roll at the end of each payment, but it is neither the quickest nor the best way. By using a card system and an adding machine it can be done much quicker and better. Clerks frequently become so irritated at the end of a payment that it worries them to hear the office door close. Overtime is often necessary in order that the pay roll will be ready on time. I mention this merely to illustrate that the old style, "made by hand" pay roll, is not the quickest and best way. If it is not the quickest way, it certainly cannot be the best way, providing the results are the same.

While working on scientific management in a mill I was asked to change the rate on a job that was wholly a hand operation. When ready to make the studies on the job, I confronted the operative, who happened to be a girl of about 20 years, and asked her whether it made any difference to her if I watched her work for a little while. I told her that I was going to make some time studies with the view of determining a fair day's work. The operative said that she didn't mind whether I took the time study but informed me that it was useless as she was aware how much she could do in a day. I asked the young lady how much she thought she could do in a day. (9 hours constituted a day). I was then informed that she knew exactly how much she could do and furthermore she knew that she was busy all the time. I had no authority to question whether or not she was busy all the time but asked her how she figured her output. She said that she could do 300 spools an hour and that she could do no more. I looked up the girl's record for two months back and found that she averaged about 1100 spools a day. I later told her of this finding and she replied by telling me that she did all she intended to do. According to her way of figuring she was busy about three hours and forty minutes out of every nine hours.

I took the time studies and reported to the office that the girl could do about 2800 to 3000 spools a day provided she was taught the more efficient way. We arranged her work to eliminate her bending over, we had the supply man push the empty trucks away and push the full trucks in place for her. We arranged the girl's wages so that she could earn more if she did more. When I left her she was doing an average of 2955 spools a day and had done 3261 one day. The girl was better satisfied with her work. She was able to earn more money and she was enthusiastic. She was satisfied to do her best under the right conditions.

A foreman of a room should simply supervise, he should not be expected to teach men the easiest and best ways of doing work. He knows that the best men have a certain way of doing things that can be taught to others and therefore a plant can be taught to increase production. It is a question of analysing and executing. Work must be laid out properly. Obstructions must be removed. A system of paying must be installed that will place the premium on the people who exercise the greatest efficiency.

This looks like a big problem, but its bigness doesn't affect its pressing call for a solution. It makes no difference what plan of scientific management you select. You are aiming at one point and they all come under the term scientific management.

In a bleachery in which I was working on scientific management they had a man in the packing room known as the "nailer." One man was employed as a "stenciler" and two men did the trucking across the room to the elevator. Each man received a weekly wage of $10.00 for 55 hours' work. I learned from observation that the output of the department was about 85 to 90 cases per day. I picked out the man best suited for the job and told him that we were going to pay him by the case for nailing, trucking and stenciling. We showed him what it meant to him and he agreed that it was now up to him to make a success of the job. I believe we made it possible for him to make $16.50 per week. I asked this same man about one year afterwards how he would like to work the old way and in reply was informed that he would quit at once if they changed the job. He was satisfied. So was the company. It is a true old saying that the less feet on the floor the better, provided there is a man for each job.

Principles form the basis for short cuts to knowledge and without knowledge you cannot be efficient. If you are not shown the shortest way you probably will never know it. If you are indifferent in the matter you will probably remain in the rut you now travel in. If you are progressive, looking out for tomorrow, you will succeed.

I recently asked an overseer of a large worsted mill why he did a certain operation. The answer was "Well, I will tell you. I have been here about 21 years and they did it when I first came." When I asked of what real value it was, the overseer told me he was sure he couldn't tell. There are thousands of men just like that overseer. They don't know the why of things they do.

We cannot depend on our fathers any more because machines are doing what they did by hand. Their ideas are

out of date. The world is becoming more and more progressive and unless you get up in line and think for yourself, act for yourself and see for yourself, you will be among the missing when the roll is called for efficient men to take the big jobs of tomorrow.

Train yourself to be efficient and don't stop to write history. Prophecy is better literature to contribute to the world's reading than history. That is the difference between the systematic manager and the efficient manager. One writes history, the other prophecy. One looks out for today, the other looks out for tomorrow, in order that today will look out for itself.

Advantages in the Use of the Hank Clock.

BY GEORGE S. BROWN.

The average mill hand as a rule does not look forward to a better position in the factory where he is employed. It is only the exceptional mill hand who will exert himself to gain extra knowledge and skill to fit himself for a higher position. An adult employed in operating a machine or set of machines, nine times out of ten, desires only to get all that he can for his own personal benefit. He does not care to do anything that he is not to receive immediate reimbursement for. In a way, none can blame.

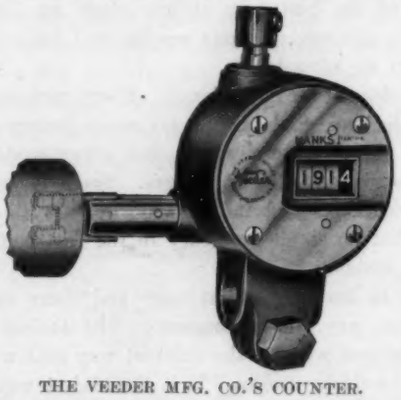
If this operative is employed by the hour, he knows right at the start what he will receive for his week's work, and further, he thinks that any extra effort he may put forth to turn off more or better work will net him nothing. If he fails to turn off a sufficient amount of work, those in charge will censure him, but so long as he keeps up to a required standard, all is well. The result of this system is obvious. Instead of trying to reach a high standard, he just manages to avoid the lowest allowed. There is no use denying it, the natural tendency of all labor is to do as little and get as much for it as possible.

In this article we will consider the use of the hank clock in the carding department. Is it an advantage to base the operatives' wages and to figure production from the hank clock? It is an advantage to use the clock for the above purposes on the slubbers, intermediates and roving frames.

Without clocks all hands are paid by the day usually, although there are cases where the hands are paid by the doff, but this system is objectionable because it leads the hands into the habit of doffing before the full bobbin knock-off acts. A couple layers short of full on a roving bobbin is not always apparent to the eye but in a week's run, it cuts into the production. Or to be more exact, a larger production is paid for than is turned off. "The more doffs, the more money," is the slogan, and unless carefully watched, frames will be doffed before full.

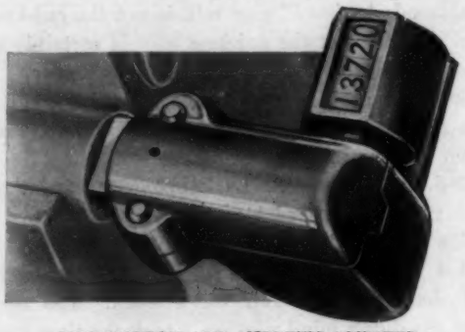
There is a vast difference in the efficiency of frame operators. If, however, you pay an efficient hand a dollar a week more than you pay another one who is not as good (and this may be very evident if both are on the same kind of frames, same number of roving, and same number of spindles) there is bound to be dissatisfaction displayed by the man getting the smaller pay. If you then raise the inferior hand's wages on a par with the better man's, you have not raised his efficiency in the least and he is still unable to equal the better man. The good man now is dissatisfied and justly, too. The result is that the skilled worker will allow his standard to drop down till it is on an equality with the inefficient man. The inferior hands set the efficiency standard for the department.

When the hank clock is used to determine the wages paid, the results are as follows: The poor hand gets paid for what he turns off. If he loafs on the job, he has to suffer for it, as the clock will show just what is turned off. With a fair wage scale, he can have no kick coming for he knows that he can earn more if he tries. In a few words, "It's up to him." It is a stimulus to "get a hustle on." If he makes an effort, he will be recompensed. The good hand now knows that his skill and labor will be rewarded. He will get every cent that he earns and from the fact that he is efficient, he will strive for the top notch production which is to the advantage of the mill as well as to himself.



THE VEEDER MFG. CO.'S COUNTER.

The man in charge of the department should have the clocks read once a day and the results posted in the room where the operatives can compare notes. This gives them an opportunity to notify the overseer if errors are made. It also creates among them a feeling that the management is treating them fairly, but the greatest advantage of posting the hanks-run, is that the operatives can compare their day's



THE MORTON AND ANDREWS COUNTER.

work with the others. It inaugurates a mild system of rivalry for leadership and it spurs everyone to do his best, especially the poor hands.

Day hands are rarely ever found who start the machinery before bell time; in fact if the overseer or second-hand is absent, the inclination is to start late and to stop early, by which the mill pays doubly for in a way. For the help get their pay based on a full day's production, but in this case the production is curtailed, so the help are really overpaid.

When wages are paid from the hank clock, the frames are started when the speed starts and run till it stops, regardless of bell time. The mill benefits and so does the help. This is but one of many benefits derived from the use of the hank clock. The effects reach out farther than at first realized. It is the custom to employ spare hands, who are

paid by the day, to assist the frame tenders in doffing. The tender knows that while the frame is being doffed, it is earning nothing for him, so he sees that doffing is speedily accomplished and that the spare hands are kept busy. If these day hands attempt to soldier on the job, the tenders will hustle them about their duties or report them to those in charge.

Frame tenders will keep a watch out for cans of drawing—if running slubbers—or roving to supply their creels before the set being used is completely run out. Empty bobbins will be ready before the frame is stopped to doff. In this way, while each hand is looking out for his own personal interests, at the same time he is keeping others right up to their full production limit. If for any reason, the work begins to run badly, piece workers will immediately notify those who are to rectify the trouble, and will keep after them until matters are straightened out.

Day hands care very little about the condition of the machinery they operate. If the machines run badly, it makes very little difference to them,—none at all with their pay envelope, and badly running work gives them an excuse for not turning off a suitable production. The tendency to let a broken machine stop until the second-hand or fixer notices it, is very liable to be the rule. The day hand stops his frames at the slightest excuse, while the piece worker keeps his frames running as steadily as possible. If there is a shortage of roving or bobbins or anything that is needed to keep the frames running, day hands are perfectly willing to let the other fellow have what there is. Not so with the hands who depend upon the hank clock for their wages; they are scouting around for their share every time.

COUNTER MADE BY THE SACO-LOWELL SHOPS.

A room where the pay is governed by the hank clock system, is a busy place, where the mill and employees profit with the exception ofthe loafer, and the sooner he is eliminated from a room the better for all in it.

Where the hands are paid by the day, the machines are cleaned at the expense of the mill. If the machines have to be stopped while certain parts are being wiped, brushed or picked off, this is done on the mill's time and at a loss in production.

Here is what happened in a mill with which I was personally connected: The fly frame tenders were paid by the hank clock and it was a rare sight to see one of them stop a frame to give it a cleaning. It became almost a custom for the hands to have their dinners brought in on Fridays, and in this way they made a quick meal and then cleaned their frames before the speed started for the afternoon. Those who couldn't have their dinners brought to them, arranged to get in early Saturday mornings to attend to their cleaning. This plan was adopted by the help themselves on their own initiative.

THE STEWART-WARNER COUNTER.

A mill wishing to change from day help to piece work successfully, should use for a base to determine the price per hank, the average production and pay of the day hands. It is supposed of course that the mill is already securing a reasonable production and paying what they consider a fair wage. Figuring from this average, when the change is made to piece work, both mill and help are sure to benefit very materially. It means more pay for the help for they are going to run their frames more hours per week, and it means to the mill an actually longer producing day.

After the change is made, in a properly managed room, the general standard of the department is bound to be raised; that is, more and better work, better condition of machinery, and an increase in the average wage. One thing must be borne in mind: If some or all of the hands bend their energies to turn off a big production, and do get it off, thereby earning for themselves a wage that may seem large, the management must not decide as is often the case: "They are earning too much in the carding room; we must reduce the price per hank."

The instant that that is done, the standard of excellence attained will surely collapse. Help will willingly exert themselves to earn a wage higher than their average, but they soon become discouraged by, and dissatisfied with a

system that compels them to work their limit to earn only a living wage. Results begin to show in the tendency to make bad work and to let it go. They allow the machines to get dirty: roller beams are never wiped off, clearers never picked, rolls rarely or never oiled, and soon the point is reached where the machinery begins to show the neglect. The hands become sulky, and the general disorganization of the department is well under way. The help feel that they are being unjustly treated, and as their pay envelopes begin to shrink, they get desperate. The good hands will leave for other mills and take the reptuation of the mill with them. Only the poor hands will remain and the mill will soon show the error of mismanagement.

There is one drawback in computing wages with the hank clock. Dishonest hands can and have tampered with clocks, making them register more hanks than have actually been run.

One mill with which I was well acquainted, had difficulty in this way. This mill had two men to look after the carding; each man had his own room. In one room the machinery was kept in A-1 condition and the frames were turning off a good production. In the other room, the frames were really in a deplorable shape and the work ran very badly, still the production from the clocks in this room exceeded that of the better conditioned room. A bit of investigating solved the mystery. In the morning and at noontime the tenders unhooked a few weights from the end of the front roll nearest the clock and pried the steel roll out of engagement with the clock. Then with a short stick, they turned the clock. To facilitate this operation, the slots where the roll worm engaged the clock gear had been filed out by the hands. The man in charge of this room was rightly blamed. Foreign help were employed in this plant, and by mixing the nationalities rather than bunching them, the clock tampering was stopped. This also served to break up the cliques and left matters so that none knew who might report any irregularity.

The proper point to begin using the hank clock is at the slubber, for this is the first machine where the skill and energy of the operative determines to a great extent, the production of the machine. There is really nothing to gain by using a hank clock on any machine previous to the slubber. Up to this point each machine has to take care of a certain amount of work determined by the management of the mill and while the quality of the work depends upon the care and ability of the operatives, the production does not, as it is practically the same whether of good or bad quality.

Then again, the moral effect of the hank clock is better among adults than among boys and girls, who are generally employed to run the railway-heads, drawing-frames, or whatever machines are used between the cards and slubbers. Minors as a rule are compelled by their parents to turn over their wages, so it matters little to them whether they receive large or small pay. If they were governed by the hank clock, it is safe to assume that they would turn off just as little work as allowed.

Cards run steadily, and regularly turn off day after day the same production. A good card grinder may keep the wire in excellent shape and the settings correct. A good card stripper may keep the cards clean and well oiled but neither of them can increase production to any appreciable extent. A system of clocks on these machines would be absolutely worthless,—an unnecessary expense actually telling nothing, because a card keeps running even when the lap has run out and no production is being turned off at all. Furthermore, on a machine operated by more than one hand, it is practically impossible to correctly compute wages by piece work. The effects of skill and honest labor of one hand can be easily offset by the very lack of these in the other or others.

Most mills have their slubbers of an equal number of spindles, at any rate, those running the same hank roving. This also applies to intermediates and roving frames. Then, a price per hank for a certain number of roving holds good on all frames of that process, but if a pair of frames running the same hank roving as another pair, have more spindles, the price per hank must be higher on the frames with the greater number of spindles. It is very evident that this must be so, because the operative has more ends to care for, more bobbins to doff, more cans of drawing to put in at the back or more roving to creel, longer frames to clean, etc. The operatives soon find this out for themselves. Of course, if the difference in the frames is but a few spindles, no account of this fact need be taken.

If much bad work, called single and double, is produced and a day hand is employed to fix the bad bobbins, then a system of small fines per bobbin should be inaugurated. If this is not done, every bad bobbin, when the cause is directly traceable to the tender, should be returned to him or her to be put into condition for the next process. Each tender should have a special colored crayon to mark each bobbin from his frames. This mark is used to designate the hank roving and also as an identification in case of faulty work. Have this mark made close up to the bobbin so it will continue to show as long as there is roving on it.

The hank clock is an accurate method for determining production of fly frames. Even if the help are not paid by the clock, production should be figured from it. Slubbers should be sized daily,—twice daily if opportunity is permitted, using two or three bobbins at each sizing from each frame. Put all the weights in a book, keeping each frame by itself, and at the end of the week, find the average of each hank roving run. If you are running a theoretical .65 hank slubber roving, actually it might be .63 hank, and that is the weight to use to figure the production. Your results will be accurate,—far more so than if you figure from the revolutions of the front roll taken by a speed indicator, and guess at the time lost for doffing, fluctuations in speed, etc. This rule holds good for intermediates and roving frames, only these are usually sized but once a day. Keep all spindles running or make a record of all stopped and deduct them when computing output. Multiply spindles by clock hanks and divide by hank roving to get pounds produced.

Two recent publications produced by the Link Belt Company, of Philadelphia and Chicago, relate to handling coal and ashes in the power plant. Book No. 296 is a 16-page monograph describing and illustrating the coal handling apparatus in the power plant of the Victor Talking Machine Company at Camden, N. J. Book No. 288 is a 16-page illustrated description of the coal and ash handling equipment at the new woolen mill of the William H. Grundy Company at Bristol, Pa. Both of these descriptions cover modern industrial plants of excellent design and construction, and may be secured from the Link Belt Company upon request.

Graddick's Cost Table No. 5

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Table showing basis of total labor cost to manufacture hosiery yarns on cones in Nos. and tenths of average Nos. from 4's to 31's, which will be found to be a convenient comparison of cost on manufacturers' reports. Average No. is based on the products and not on sub-division of spindles. Compare these figures with any set of your reports on these Nos. and note the difference between them.

No. Yarn.	Comp. Cost No.	Comp. Cost No. & 10th.	Comp. Cost No. & 20th.	Comp. Cost No. & 30th.	Comp. Cost No. & 40th.	Comp. Cost No. & 50th.	Comp. Cost No. & 60th.	Comp. Cost No. & 70th.	Comp. Cost No. & 80th.	Comp. Cost No. & 90th.	Only in Nos. from 31's to 100's.					
											Yarn No.	Cost.	Yarn No.	Cost.	Yarn No.	Cost.
4	1.10	1.10	1.11	1.12	1.12	1.13	1.14	1.14	1.15	1.16	32	3.40	60	6.50	88	10.40
5	1.17	1.17	1.18	1.19	1.19	1.20	1.21	1.21	1.22	1.23	33	3.50	61	6.63	89	10.55
6	1.24	1.24	1.25	1.26	1.26	1.27	1.28	1.28	1.29	1.30	34	3.60	62	6.76	90	10.70
7	1.31	1.31	1.32	1.33	1.33	1.34	1.35	1.35	1.36	1.37	35	3.70	63	6.89	91	10.86
8	1.38	1.38	1.39	1.40	1.40	1.41	1.42	1.42	1.43	1.44	36	3.80	64	7.02	92	11.02
9	1.45	1.45	1.46	1.47	1.47	1.48	1.49	1.49	1.50	1.51	37	3.90	65	7.15	93	11.18
10	1.52	1.52	1.53	1.54	1.54	1.55	1.56	1.56	1.57	1.58	38	4.00	66	7.28	94	11.34
11	1.59	1.59	1.60	1.61	1.62	1.63	1.63	1.64	1.65	1.66	39	4.10	67	7.41	95	11.50
12	1.67	1.67	1.68	1.69	1.70	1.71	1.71	1.72	1.73	1.74	40	4.20	68	7.54	96	11.66
13	1.75	1.75	1.76	1.77	1.78	1.79	1.79	1.80	1.81	1.82	41	4.31	69	7.67	97	11.82
14	1.83	1.83	1.84	1.85	1.86	1.87	1.87	1.88	1.89	1.90	42	4.42	70	7.80	98	11.98
15	1.91	1.91	1.92	1.93	1.94	1.95	1.95	1.96	1.97	1.98	43	4.53	71	7.94	99	12.14
16	1.99	1.99	2.00	2.01	2.02	2.03	2.03	2.04	2.05	2.06	44	4.64	72	8.08	100	12.30
17	2.07	2.07	2.08	2.09	2.10	2.11	2.11	2.12	2.13	2.14	45	4.75	73	8.22		
18	2.15	2.15	2.16	2.17	2.18	2.19	2.19	2.20	2.21	2.22	46	4.86	74	8.36		
19	2.23	2.23	2.24	2.25	2.26	2.27	2.27	2.28	2.29	2.30	47	4.97	75	8.50		
20	2.31	2.31	2.32	2.33	2.34	2.35	2.35	2.36	2.37	2.38	48	5.08	76	8.64		
21	2.39	2.39	2.40	2.41	2.42	2.43	2.44	2.45	2.46	2.47	49	5.19	77	8.78		
22	2.48	2.48	2.49	2.50	2.51	2.52	2.53	2.54	2.55	2.56	50	5.30	78	8.92		
23	2.57	2.57	2.58	2.59	2.60	2.61	2.62	2.63	2.64	2.65	51	5.42	79	9.06		
24	2.66	2.66	2.67	2.68	2.69	2.70	2.71	2.72	2.73	2.74	52	5.54	80	9.20		
25	2.75	2.75	2.76	2.77	2.78	2.79	2.80	2.81	2.82	2.83	53	5.66	81	9.35		
26	2.84	2.84	2.85	2.86	2.87	2.88	2.89	2.90	2.91	2.92	54	5.78	82	9.50		
27	2.93	2.93	2.94	2.95	2.96	2.97	2.98	2.99	3.00	3.01	55	5.90	83	9.65		
28	3.02	3.02	3.03	3.03	3.05	3.06	3.07	3.08	3.09	3.10	56	6.02	84	9.80		
29	3.11	3.11	3.12	3.13	3.14	3.15	3.16	3.17	3.18	3.19	57	6.14	85	9.95		
30	3.20	3.21	3.22	3.23	3.24	3.25	3.26	3.27	3.28	3.29	58	6.26	86	10.10		
31	3.30	3.31	3.32	3.33	3.34	3.35	3.36	3.37	3.38	3.39	59	6.38	87	10.25		

This is an average for simple process white yarns. Extra cost for fancies in dyeing for colored work, double carding, and combing should be taken into account and added when done.

In order to compare other processes of cost, deduct cost of winding and add the cost of other finishing processes, such as weaving, twisting, warping, etc.

Dyeing, Bleaching and Finishing.

The Analysis of Natural Dyestuffs.

BY A. F. MUSGRAVE.

Owing to the war and the consequent great rise in the price of dyestuffs, it has been necessary for manufacturers to pay more attention to the testing of samples offered to them by dealers. The manufacturer has been pretty safe in buying from the dealer from whom he purchased prior to the war, but often being unable to obtain the required products from that source, he has been compelled to buy from speculators, some of whom, not caring for their reputation and wishing to clean up a fortune while the sun shone, have put over some very poor stuff. This refers more particularly to the coal tar products which have been going the round of the market for the past year; as some of these products if labeled according to some such standard as the pure drug act would be marked "Common salt with a trace of aniline color." It is, however, not only in the anilines, but also in the natural dyestuffs, that this adulteration has been practiced. It is to be regretted that there is no absolute standard for the dyeing strength of colors, strength being merely comparative against another sample of the same product.

For years many concerns have considered that the term 51 degrees Tw., when applied to logwood or fustic extract, was a reliable indication of the dyeing strength, but this is not the case. There may be two samples of logwood extract which are submitted to the manufacturer and both may test 51 degrees Tw., when tested with a hydrometer. When a comparative dye test is made of these two samples it may be found that one requires 20 per cent more than the other to produce the same depth of color. This is also true of fustic and all other extracts as well, it being a very simple matter to raise or lower the specific gravities, within very wide limits, by the use of such products as glucose and molasses. It will therefore be seen that there is only one method of correctly arriving at the money value of a sample of extract and that is by a comparative test of its dyeing strength against a standard.

ANALYSIS OF LOGWOOD EXTRACTS.

The mill man at the present day wants a quick accurate method of estimating the value of samples of extracts which may be submitted to him. Of the various extracts it will be found that logwood is the most difficult to analyze in a quick and satisfactory manner. This is due to the fact that logwood extracts may be of two kinds, that is, they may be unoxidized or may be in the wholly oxidized state, in which condition they are known as hematine extracts. It is thus necessary to find the dyeing strength and also the state of oxidation of the sample in order to definitely decide the value for a particular purpose.

Two grams of the sample, two grams of a standard logwood extract and two grams of a standard hematine extract are weighed up separately and each dissolved in 200cc of water. The color of the solution is no reliable indication of its strength, as the color depends largely on the purity of the water which entered into the manufacture of the extract. As logwood must be dyed over a chrome bottom, it is necessary to prepare yarn in this manner. Some methods for the determination of the money value of extracts require the use of yarns which have been prepared with a variety of mordants. This is a great bother and it will therefore only be necessary to prepare one lot of worsted yarn using 3 per cent of chrome and 2½ per cent of cream of tartar, entering cool and boiling for one and one-half hours. The yarn is then rinsed off, dried and reeled off into 5 gram skeins. By mordanting up a large amount of this yarn and then reeling off in 5 gram skeins there is no possibility that the different skeins will have different amounts of mordant deposited on them.

Dyebaths are then made up in porcelain beakers using 50cc of the solutions. This makes three tests, one of the standard logwood, one of the standard hematine and one of the sample which is being tested. When the baths are prepared the skeins are entered in each and the baths brought to the boil and boiled for one-half hour. Small clippings are then detached from the three skeins and are labeled according to the skein from which they came. One per cent or 5cc of a one per cent copper sulphate solution is then added to the three beakers and the dyeing continued for another half hour. The skeins are then taken out, rinsed and dried and the clippings attached to the skein from which they came. If the skein of the sample under examination corresponds to the skein of the standard logwood dyeing and the shade of the clippings of the two skeins are very similar, it shows that the logwood is in the unoxidized condition and is of good strength. In case its exact strength is needed it may be necessary to make a few more tests with more or less of the standard, depending on whether the new sample is weaker or stronger. If the skein compares favorably in strength with the dyeing of the hematine sample it is proof that the sample is in the oxidized condition. On addition of the copper sulphate to a logwood dyeing a great increase in strength is obtained. On addition of the copper sulphate to the dyeing of hematine very little change in depth of color will be found. This is due to the fact that the coloring matter of logwood is in an unoxidized state and bluestone is a very vigorous oxidizer while hematine being already fully oxidized cannot be increased in coroing power by the bluestone, but is in reality weakened, due to being over-oxidized. Assuming that the sample which is being tested has given a good result in this test, it is also wise to dye it on cotton yarn according to either the one bath or the sumac bottom method, depending on what method is used in practice. This is of course only necessary where the sample of logwood extract is to be used for dyeing cotton.

FUSTIC EXTRACTS.

Fustic extracts may be adulterated with quercitron, osage orange, etc., but their presence may readily be detected by the following simple test: Solutions are prepared which should be 2 grams of the extract to 200cc of water. Four dyebaths are then set up. Two with 15cc of color solution

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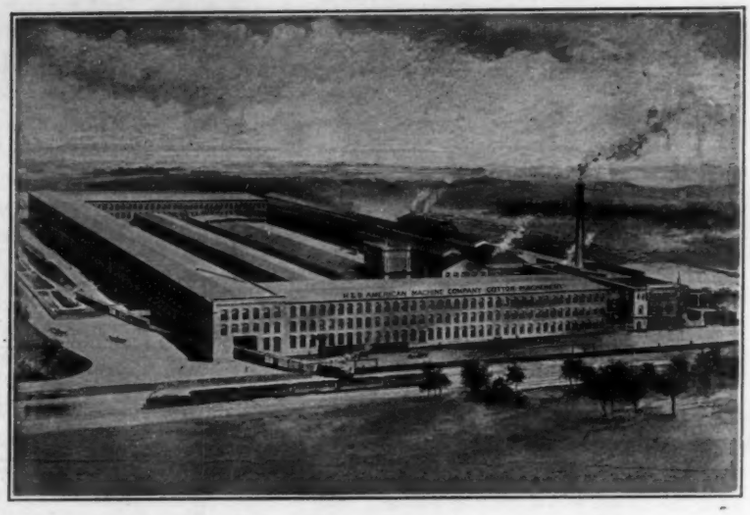

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each and 200cc of water and two with 50cc color solution, 20cc of 1 per cent copper sulphate solution and 180cc of water. The first two baths are for the chrome bottom worsted yarn, such as was used in the logwood testing, while the latter are for 10 gram skeins of cotton yarn. The beakers are then put into the bath and boiled down for one-half hour when the cottons may be taken out. Three per cent of acetic acid is then added to the worsted dyebaths and the boiling continued for another half hour. The worsted skeins are then taken out and all four dried. A good fustic will show against the standard, the same differences in strength on the chrome bottom as on the cotton skeins. By this I mean that if the new sample appeared to be 10 per cent weaker than the standard when dyed upon worsted, it should appear to be only 10 per cent weaker in the dyeings on cotton. In case it shows up stronger on cotton than the standard it is evidence that it is a better or purer fustic than the standard, while if much weaker it is evident that it is highly contaminated with quercitron or osage orange. The value of this test relies on the fact that quercitron and osage orange do not dye cotton as well as fustic extract, and while a fustic extract which is adulterated with either of these products may be satisfactorily used by the woolen dyer it is of lesser value for cotton.

INDIGO.

Indigo is used in the vat and it will naturally be best to test it in that manner. Where the number of samples which are to be tested is not large, small vats may be made up in beakers, using the well known caustic hydrosulphite method of reduction. This form of vat is the only one which can be made up in this small way as it would be a very difficult matter to get two fermentation vats alike. Indigo may also be valued by being converted into indigo sulphonic acid in which condition it dyes wool in the same manner as an acid color. When testing natural indigo it is of prime importance to secure a good sample and this is best done by grinding the sample in a mortar until it is a smooth even powder. One gram of the sample and one gram of the standard are then weighed in glass beakers of about 400cc capacity. The powder is then slightly moistened with alcohol and rubbed with a glass rod to a smooth even paste. Two hundred cc of cold water, 5cc of 10 per cent caustic soda solution and .05 grams of hydrosulphite conc. are then added to each beaker. The beakers are then well stirred and placed where they will heat up to 120 degrees F. Care should be taken that the two beakers are heating up evenly. When the vats have become fully reduced, as is shown by the yellowish green color and freedom from sediment, two 10 gram skeins of cotton yarn are introduced, turned once or twice and then pushed under the surface of the liquor with glass rods. At the expiration of 20 minutes they are taken out, wrung well over the beakers, shaken out and hung in the air to oxidize. As the exhaustion of the various indigoes is not always the same it is necessary to enter the skeins for another dip and this can only be done after the baths have been brought back to the fully reduced condition. This is done by adding equal amounts of caustic solution and hydrosulphite to each beaker and reheating to 120 degrees F. The skeins which by this time should be of the regular indigo blue color are then re-entered and given a few turns and then treated as before. At the end of twenty minutes they are squeezed out, oxidized, washed and dried and the color then compared.

This is a very long process and it must be carried out

with great care as a little more hydrosulphite or caustic in one beaker than in the other will lead to results which are not accurate. In order to shorten the labor which is attached to indigo testing some concerns make use of the sulphonation method which has been previously mentioned. One gram each of sample and standard are weighed off and placed in liter flasks. Forty cc of concentrated sulphuric acid is then poured over each and water is then cautiously added to the mark. The water must be added slowly so as not to overheat. The flasks are then put on a water bath and kept at a temperature of 120 degrees F for twelve hours. The indigo will then have been all changed to indigo extract, and dyebaths may be made up using 50cc of each solution and dyeing a skein of woolen yarn in each. It will not be necessary to add acid to the dyebath as there will be an excess of acid over that required for the sulphonation.

CUTCH AND GAMBIER.

The only correct method of testing these products is by a comparative test. The percentage of tannin which they contain is no criterion of their dyeing strength. The samples are best tested on cotton yarn using about 20 per cent of the samples. This means that 2 grams must be weighed off for a 10 gram skein of cotton. The cutch is washed from the scale pan to the beaker with 180cc of hot water and 20cc of a 1 per cent copper sulphate solution is then added. The yarn is then entered into the beakers and the baths brought to the boil and kept at that temperature for one-half hour, taking care to keep the water in the beakers at the same height. The skeins are then wrung out without rinsing and entered into a bath which contains 2 per cent of chrome. The baths are heated to 16 degrees F. for one-half hour and the skeins then taken out and rinsed. The skeins are then dried and the depth of color noted. The shade must also be considered, as a greenish cutch is more suitable for the dyeing of khaki shades, while a red cutch is desired for red brown shades.

Discharging Indigo With Hydrosulphite Without Steaming.

The hydrosulphite formaldehyde for indigo has replaced the chromate discharge in Russia, where the style is produced on a large scale. The principal advantage is that the fiber is not attacked, but its drawbacks, especially when it is not a matter of everyday routine, have prevented it from replacing universally the chromate discharge.

The drawbacks are, in addition to the necessity of steaming, that the partial reoxidation of the indigo is always to be feared, even in using the strongest hydrosulphite, if the process is not finished the same day. Moreover, the price of the printing paste is greatly increased by the cost of the hydrosulphite and anthraquinone; so that the process has no distinct advantage in cost as compared with the chromate discharge.

Struck by the rapidity with which indigo is reduced in the presence of free hydrosulphite slightly alkaline and warm, M. A. Juteau conceived the idea that a simplification of the hydrosulphite discharge could be effected by printing a stable insoluble hydrosulphite and transforming it into an active hydrosulphite of sodium by passing the goods through a slightly alkaline bath. This would immediately reduce the indigo in the printed design, and allow it to be eliminated in its leuco state.

Juteau experimented with the hydrosulphites of zinc, barium, and calcium. In printing, it is preferable to precipitate them in the printing paste. He quickly noted that these salts only precipitated well in a neutral concentrated solution, and in presence of an excess of the precipitant. The stability of the color depends directly upon the perfection of the precipitation.

The best results were obtained with hydrosulphite of zinc. He finally arrived at the following method, which consists in precipitating the hydrosulphite of zinc in the presence of an excess of oxychloride of zinc, which it carries away with it in precipitation. An extremely stable paste is thus formed, at least as stable to the atmosphere and heat as hydrosulphite formaldehyde. The necessity of using a concentrated solution led to the use of hydrosulphite in powder. The following is a recipe for a kilogramme of printing paste:—

Make a paste of 150 grammes of hydrosulphite powder, 30 grammes oxide of zinc, and 100 grammes of ice water. Add to this 100 grammes of chloride of zinc, and make up to a kilo with dextrine or gum tragacanth. The printing paste requires several hours to reach its utmost degree of stability.

This is printed on and quickly dried without fear of decomposition. Then, without steaming, the goods are passed at full width through a boiling bath containing 10 c.c. of caustic soda at 40 degrees Be. per litre. A passage of ten to fifteen seconds reduces completely the printed parts. The fabric is then passed, as in the case of ordinary discharging with hydrosulphite, into a second bath containing 5 c.c. per litre of silicate of soda at the boil. In this bath the leuco indigo is completely eliminated.

As the first bath becomes rapidly charged with active hydrosulphite, it attacks the ground color after the passage of a few pieces, and consequently it must be renovated. This drawback is more accentuated than in the ordinary process, but as a very short passage is given, the dimensions of the vat can be reduced in order to economize the renovation of the bath.

The process has several notable advantages. It is much cheaper in the materials used, and reoxidation is not to be feared. The printing paste keeps well and prints well, in spite of the large addition of chloride of zinc, which helps to give a good white. The suppression of the steaming process is also an economy.

It may be added that the goods may be steamed, but this is perfectly unnecessary. The indigo is reduced by steaming, but the diazo and direct ground colors are not attacked. The hydrosulphite of zinc may also serve to fix Indanthrenes or Algol, which may be added to the discharge paste. The goods are passed through a caustic soda bath as in the ferro sulphate and tin salt process, with the advantage that the caustic soda need not be so concentrated, and the long souring is unnecessary.—The Dyer and Calico Printer.

As there are no textiles manufactured in Paraguay, and as this line is one for which there is always a demand, there is a shortage now of practically all kinds of fabrics. In cotton goods this shortage is especially noticeable.

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We know from experience of almost fifty years that a roof laid strictly according to The Barrett Specification with the workmanship properly safeguarded will last twenty years and more without repairs of any kind, and we are issuing this twenty year Surety Bond so that owners of these roofs will get the benefit of that experience.

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Notes About Men You Know.

GEORGE O. SMALLEY has been promoted to first vice-president and general manager of the Bound Brook Oilless Bearing Company, succeeding the late Leigh S. Bache. Mr. Smalley has been connected with this company for the

GEORGE O. SMALLEY.

past ten years and for the last four years in the capacity of assistant general manager and assistant treasurer, and is, therefore, thoroughly conversant with the method of both the sales and production departments of this rapidly growing business.

JOSIAH BUTLER is acting as temporary treasurer of the Shaw Stocking Co., Lowell, Mass., until the annual meeting, when a successor will be elected to William E. Hall, resigned.

J. T. KERSEY, of New Orleans, La., has accepted the position of overseer of carding and spinning at Bonham Cotton Mill, Bonham, Texas.

G. T. ROBERTS, superintendent of the Washington Mills at Fries, Va., was in Atlanta on a business trip in the early part of November.

DONALD COMER, manager of the Comer group of mills at Birmingham and Sylacauga, Alabama, was a visitor in Atlanta in the early part of the past month.

C. B. CAPERTON, the secretary of the Trion Company at Trion, Ga., accompanied by Superintendent C. P. Thompson from the same mill, were recent visitors in Atlanta.

ROBERT J. EDWARDS has been elected president of the Bates Manufacturing Co., Lewiston, Me., succeeding Charles Fiske.

D. T. BAGWELL has resigned as superintendent of the Richland plant of the Pacific Mills, Columbia, S. C., and accepted a similar position at the Asheraft Mill, Florence, Alabama.

N. B. DIAL, president of the Laurens (S. C.) Cotton Mills, has announced that he will be a candidate for the United States Senate.

J. H. MAYES, formerly superintendent of the Fitzgerald (Ga.) Cotton Mills, is now filling a similar position at the Hawkinsville, (Ga.) Mills .

H. J. TRIMBACH has accepted a position as overseer of dyeing at the Stonewall Cotton Mills, Stonewall, Miss.

CHARLES HAYES, JR., who recently resigned his position as superintendent of the Grant Yarn Co., Fitchburg, Mass., will become treasurer of the Argo Mills, cotton yarn spinners, Gloucester City, N. J.

F. D. WILLIAMS has resigned as superintendent of the Harden Mills, Worth, N. C., and moved to Sylacauga, Ala.

S. W. MIMS has been transferred from superintendent of the Granby Mill, Columbia, S. C., to superintendent of the Capital City plant of the same place.

H. E. HOUGHTON, until recently connected with the Dwight Manufacturing Co., Chicopee, Mass., has been appointed superintendent of the Grant Yarn Co., Fitchburg, Mass., succeeding Chas. Hayes, Jr.

T. M. MCNEIL, superintendent of the Olympia Mill, Columbia, S. C., has been given charge of the Granby Mill also.

J. B. PARKER has resigned as night superintendent of the Central Mills, Sylacauga, Ala., to become superintendent, both day and night, at the Sally B. Mills of the same place.

R. M. MAULDIN, who has charge of the machinery and shafting department for J. E. Sirrine at Greenville, S. C., was recently married to Miss Dorothy Neild, of Vicksburg, Miss.

R. E. STEARNS, formerly of Danville, Va., has accepted position of assistant superintendent of the Central Mills, Sylacauga, Ala.

G. H. LOCKMAN has been promoted from night overseer of weaving to assistant superintendent of the Fitzgerald (Ga.) Cotton Mills.

A. E. WATTS, of Taylorsville, N. C., has accepted the position of superintendent and manager of the Gywnn-Harper Mfg. Co., Patterson, N. C.

T. J. BOYNTON has resigned as overseer of carding at the Palmetto (Ga.) Cotton Mills, to become superintendent of the Hutcheson Mfg. Co., Banning, Ga.

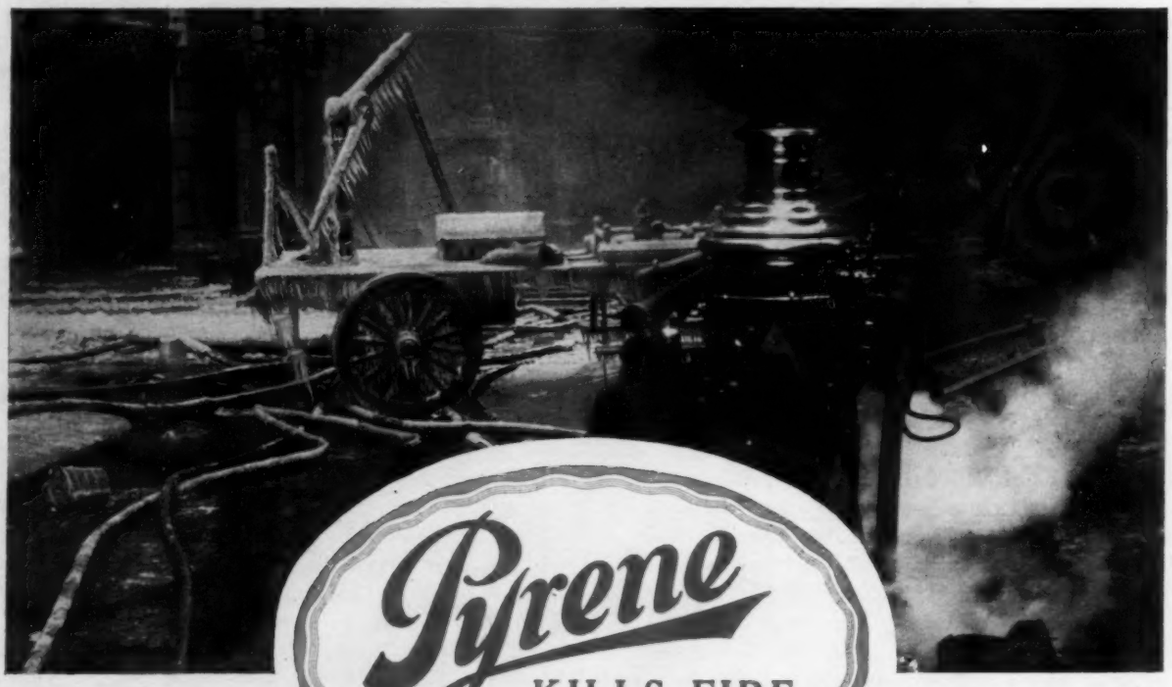
J. D. Galloway has resigned as overseer of weaving at the Batesburg (S. C.) Mills to become superintendent of the Palmetto Mills, Columbia, S. C.

VIVIAN M. MANNING, who has been connected with the Parker Cotton Mills Co., as purchasing agent for the past six years, is to retire from the business as purchasing agent and will establish a brokerage business in Greenville, S. C., handling cotton mill stocks, real estate and insurance. In addition to purchasing for the Parker Cotton Mills Co., Mr. Manning also purchased for a number of other cotton mills, having a total of twenty-three mills for whom he purchased supplies. He has made many friends in the trade who will wish him success in his new venture.

E. H. BOST has resigned as overseer of weaving and assistant superintendent of the Brown Mfg. Co., Concord, N. C., to become superintendent of the Brancord Mills of that place.

J. E. MYERS has resigned as overseer of cloth room at Enoree, S. C., to accept a similar position with the Ottaray Mills, Union, S. C.

W. R. Tattersall, superintendent of the Gaffney (S. C.) Mills, has returned from West Warren, Mass., where he was called by the illness of his sister.



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ATLANTA BOSTON DALLAS

L. R. GILBERT, who has been superintendent of the Caraleigh Cotton Mills for the past four years, has accepted a position as superintendent of the Brown Manufacturing Company, Concord, N. C. He will be succeeeded at the Caraleigh Mills by C. J. Hall, who was overseer of finishing and cloth room at the Whittenton Mills, Taunton, Mass. Both these men are graduates of the Textile Department at the A. & M. College, Raleigh, N. C..

J. S. STROUD, another graduate of this Textile Department, was recently appointed assistant manager of the Cooleemee Mills, Cooleemee, N. C.

SAMUEL DIGGLE has accepted a position as overseer of cloth Mills, Welland, Ont., Canada. He was formerly employed by the Adams Manufacturing Co., Shelton, Conn.

PETER OLIVER, formerly overseer of the duck weaving department for the Boott Mills, Lowell, Mass., has accepted a position as night overseer of weaving for the Jenckes Manufacturing Co., Pawtucket, R. I.

T. F. GARDNER has resigned his position at the Highland Mills, High Point, N. C., to become night overseer of spinning at the Pomona Mills, Greensboro, N. C.

SAM ZIMMERMAN has been chosen as purchasing agent for the various plants of the Victor-Monaghan Mills, as well as some fifteen other plants which were formerly served by V. M. Manning, who has retired to enter another line of business.

THOMAS CLAY, foreman of dyeing for the corduroy department of the Crompton Co., Arctic, R. I., has been given the velvet dyeing, in addition to the corduroy department. Mr. Clay has been with the Crompton Co., for the past twenty-three years.

J. F. WHARTON has resigned as overseer at the Grantville (Ga.) Hosiery Mills, to become overseer of spinning at night at the Imperial Mills, Eatonton, Ga.

HARRY ALLEN has accepted a position as overseer of carding for the Sharp Manufacturing Co., New Bedford, Mass. He was formerly employed at the Wamsutta Mills, New Bedford, Mass., and later at Willimantic, Conn.

J. H. WAITS has been promoted from second hand to overseer of weaving at the Hermitage Mills, Camden, S. C.

R. A. HUGHES has resigned as overseer of spinning at the Paola Cotton Mills, Statesville, N. C., to become overseer of carding and spinning at the Delgado Mills, Statesville, N. C.

DAVID R. HARRIMAN, SR., who it was recently noted in these columns had been appointed superintendent of the Mississippi Cotton Mills Company at Moorhead, Miss., is in reality agent and manager for those mills.

J. J. MEADOWS has accepted a position as overseer of carding for the Goodyear Cotton Mills, Killingly, Conn.

C. R. HUGHES has accepted the position of overseer of spinning at the Paola Mills, Statesville, N. C.

E. L. NUNNERY, day overseer of weaving at the Fitzgerald (Ga.) Cotton Mills has been given charge of both day and night runs.

STEVE M. CROLLEY has resigned as overseer of spinning at the Palmetto Mills, Columbia, S. C., to accept a similar position at the Saxe-Gotha Mills, Lexington, S. C.

GEORGE MOORE has taken a position as color mixer for the Waldrich Bleachery, Delawanna, N. J.

GEORGE HAWKINS has resigned as second hand of spinning at night in the Corraher Mill at Landis, N. C., and has accepted a position in the Linn Mill.

L. A. ROLFE has resigned from his position with the Princeton Mill at Salisbury, N. C., and has accepted a position as second hand of night spinning at the Corraher Mill at Landis, N. C.

J. H. QUINLAN for twenty years the superintendent of the Cedartown Cotton and Export Co., at Cedartown, Ga., has recently been promoted to the position of manager and has been made a director in the company.

CHARLES R. BRUMBY has been promoted from overseer of spinning to the position of superintendent at the Cedartown Cotton and Export Co.

R. C. FREEMAN, of West Point, Ga., has been re-elected president of the Dixie Cotton Mills at LaGrange, Ga.

D. T. BLAKEY, who has represented the Link-Belt Company of Chicago, Philadelphia and Indianapolis, at Knoxville, Tenn., for sometime, has been assigned additional territory. He has opened an office at 309 American Trust Bldg., Birmingham, Ala. He still continues a Knoxville office in the Empire Building.

BEN R. DABBS, formerly representing the Arabol Manufacturing Company in Georgia, Alabama and Tennessee, has resigned to accept a similar position with the National Aniline and Chemical Company.

PAUL S. HADDOCK, the popular southern representative of A. Klipstein & Company, with offices at Charlotte, was married in Charlotte on November 2d. John L. Dabbs, formerly Southern Manager for A. Klipstein & Co., attended Mr. Haddock as best man.

EDWIN HOWARD, of Greenville, S. C., the well known southern representative for the Mason Machine Works, has recently completed arrangements with the Hopedale Mfg. Co., Milford, Mass., to handle their automatic looms.

CHARLES SCOTT, formerly overseer of dyeing for W. C. Plunkett & Son, North Adams, Mass., has accepted a position as overseer of dyeing for the Worcester (Mass.) Bleach & Dye Works.

J. E. HARRIS has resigned from overseer of weaving at the Shawmut (Ala.) Mill to accept the position of assistant superintendent at the Tallassee (Ala.) Mills.

J. C. HAILE, passenger traffic manager of the Central of Georgia Railway Co., died at Savannah on Nov. 20th.

T. J. BAGWELL has been promoted from superintendent of the Palmetto Mills, Columbia, S. C., to assistant general superintendent of the group of mills which are managed by H. C. Dresser as general superintendent.

ARTHUR V. FARR, who for the last three years has been Advertising Manager of the S. K. F. Ball Bearing Company, Hartford, Connecticut, has accepted the position of Sales Manager of the Hess Steel Corporation of Baltimore, Md.

SILAS RAY RILEY, of the office of J. E. Sirrine, Greenville, S. C., was married on the 12th of December to Madge Lorena, daughter of Judge James Landrum Webb, of Shelby, N. C.

MAURICE HARCOURT, of Villa Rica, Ga., has become night overseer of spinning at the Hutcheson Mfg. Co., Banning, Ga.

L. T. CURRY has resigned as overseer of weaving at the Lauderdale Mills, Meridian, Miss., to accept a similar position at the Mills Mfg. Co., Greenville, S. C.

J. L. BURWELL has resigned as overseer of cloth room at the Grendel Mills, Greenwood, S. C., to accept a similar position at Enoree (S. C.) Mills.

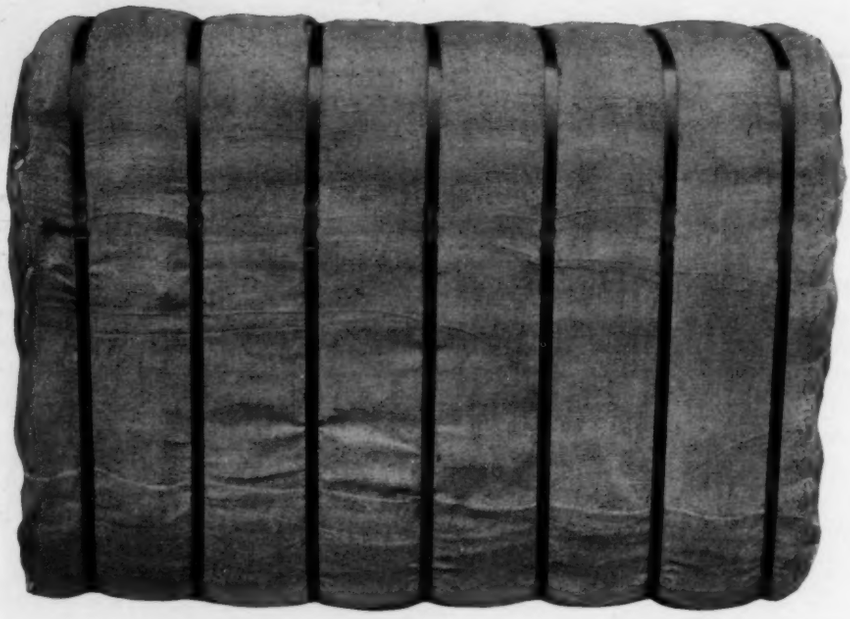
Tie Your Bales

by the

"SIGNODE SYSTEM"

ECONOMICAL—EFFICIENT—ATTRACTIVE—SECURE

5/8" Signode Tie and Signode Actual Size.



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The SIGNODE SYSTEM consists of encircling a package with SPECIAL SIGNODE STRAPPING, drawing the strap very tight and interlocking the overlapping ends within a metal sleeve (SIGNODE) in such a manner that the joint has a greater tensile strength than the strap itself.

"Signode System" Spells Safety

The SIGNODE SYSTEM is perfectly adapted for bales of all kinds. It costs no more than the present buckle now used and is more quickly applied.

By its use several feet of Tie to each bale are saved. All exposed ends of Ties are covered, making a smooth surface.

SIGNODE TIES DO NOT STRETCH—therefore the bale can be reduced to required density and positively held. The appearance of the bale is greatly enhanced.

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BOOK REVIEWS

All Books Reviewed Under This Heading May Be Procured From COTTON at the Published Price.

THE FINISHING OF JUTE AND LINEN FABRICS. By Thomas Woodhouse, Member of the Textile Institute. 326 pages. Illustrated. Published by Emmott & Co., Ltd., 65 King Street, Manchester, England. Price 8s. 6d. net.

This carefully planned work by Mr. Woodhouse will fill a distinct want in the field of textile research. The twenty chapters and nearly 400 illustrations carry the reader in detail through the many various processes. It is a book that will be read with interest by many students of the textile industry.

"Hunt's Water Controlling Apparatus" is the title of a new water controlling apparatus catalogue, No. 30, issued by the Rodney Hunt Machine Company, of Orange, Mass. This 112-page booklet is attractively bound in heavy colored covers and thoroughly illustrated throughout. It comprises a comprehensive list of water controlling appliances, such as are constantly required in connection with canals, penstocks, flumes, irrigation and sewerage improvements. While the designs shown are merely representative of types which they have manufactured, they have many other patterns of modified equipment made to suit individual specifications, and they emphasize the value of their extensive experience and large engineering force to supply reliable and superior quality apparatus for any special conditions which may arise around the mill premises.

"Link Belt Silent Chain for Transmitting Power in the Dye Making Industry" is the title of a four-page folder recently issued by the Link Belt Company, Thirty-ninth Street and Stewart Avenue, Chicago, Ill. Illustrations are shown of power transmissions and drives installed in the plant of the Schoellkopf Aniline & Chemical Works, Inc., Buffalo, N. Y. Over one thousand drives of this character are in operation in the magnificent new plant of the Schoellkopf Company. In writing for information on this drive, refer to Bulletin No. 282.

Kaustine Company Sales Station.

A Southern sales station and warehouse has been opened by Kaustine Company, Inc., of Buffalo, N. Y., for the better handling of their waterless sanitary toilets in the South. It is located at Greenville, S. C., and is in charge of L. P. Kilgore, with offices at 304 Wallace Building. The rapid growth of this progressive concern warrants the expectation that they will soon be manufacturing at this point for their Southern business, which already comprises many successful local agencies. Everybody concerned in public welfare will be pleased to note this evidence of progress along the very difficult line of providing suitable toilets for factories and mill villages, where water supply and sewer facilities are difficult to obtain.

Accuracy.

Accuracy is the twin brother of honesty, the father of success, the progenitor of genius.

It is the infinite art of taking pains; it is the quality which differentiates between success and mediocrity—often between life and death.

An accurate man reads his correspondence carefully, adds his figures correctly the first time, familiarizes himself with what he has to do, and keeps away from the business end of automobiles and street cars. He rarely makes a slip, because it is his habit to know beforehand that he is right.

The inaccurate man fumbles through his day's work with a lick and a promise, gets out of balance, guesses at the contents of a file rather than read it through, and every now and then one of his kind arises in the dark and takes a spoonful of medicine out of the wrong bottle, and is laid away with honors by his lodge.

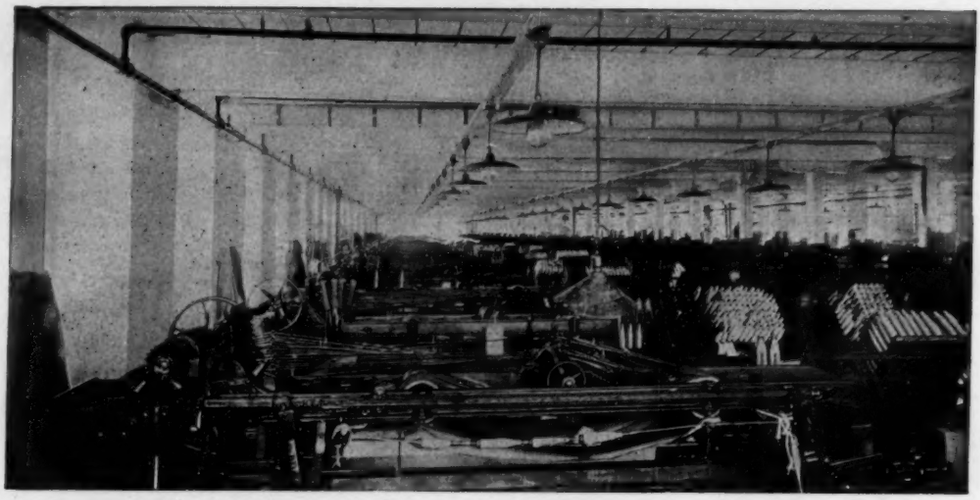
Inaccuracy is foolish, wasteful, unnecessary and dangerous. The chance-taker, whether at the counting table or in the shop, is a menace to his business, his friends and himself.

The inaccurate fellow rarely ever attains any great degree of success, and stands little chance of accumulating anything. The only property he can count on possessing at death is a small piece of real estate, about seven by four feet.—*The Right Way.*

Whether his employees take pride in doing their work well, is of some concern to the modern textile manufacturer. He can ill afford to have them careless and inefficient. If he can show the "hands" that he is taking pains and putting high-grade material into the products of his mills, he will most certainly win the approval and cheerful cooperation of his men. In relieving them of the troubles anent to sizing with tallow, notorious for its changeability, the manufacturer gets more vim and "pep" into the employees who have this in their care. Soluble softening oil, made by The Arabol Manufacturing Company, 100 William Street, New York City, wins the sincere appreciation of the efficient workman by its uniformity, ease of handling and by the higher grade of finish it puts on the warps.

POTASH FROM SARAGOSSA SEAWEED.—Attention has been directed to the possibility of exploiting deposits of seaweed which are present in such abundance in the Saragossa Sea of the Central Atlantic. Vast amounts of this seaweed are thrown up on the coasts of the Bahamas. In one harbor, the accumulations of hundreds of thousands of tons render navigation at times almost impossible. The dried kelp obtained from this seaweed contains on an average 9 per cent of potash. Concessions might be obtained for operations on the Bahama Islands, or the work could be carried on directly in the Atlantic. Although this source of potash-bearing material lies so near to the seaports of the Southern Atlantic states, where such large amounts of potash are annually required as fertilizer, it would appear doubtful whether the proposition offers any advantage over the utilization of the kelp on the Pacific littoral of the United States. As shown in the recent report issued by the Bureau of Foreign and Domestic Commerce on "Potash Production in California and Potash from Kelp," the dried kelp from the Pacific coast contains 18.9 per cent of potash.

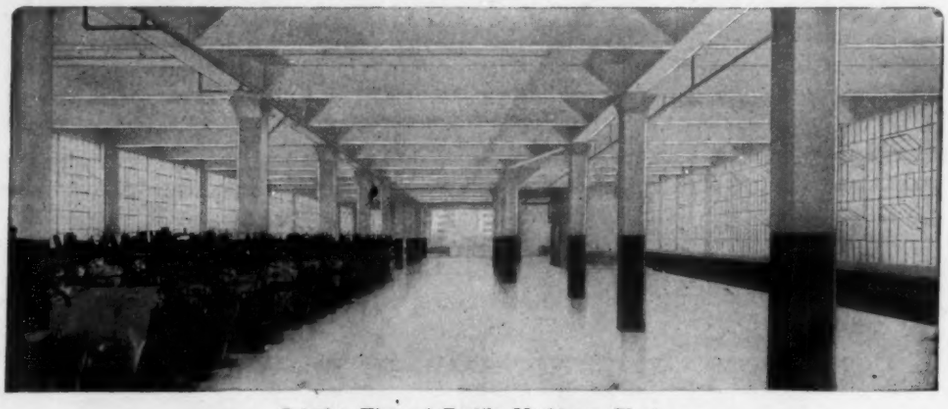
CHAFFEE'S MILL WHITE MAKES DAYLIGHT



Interior View of Worsted Mill.

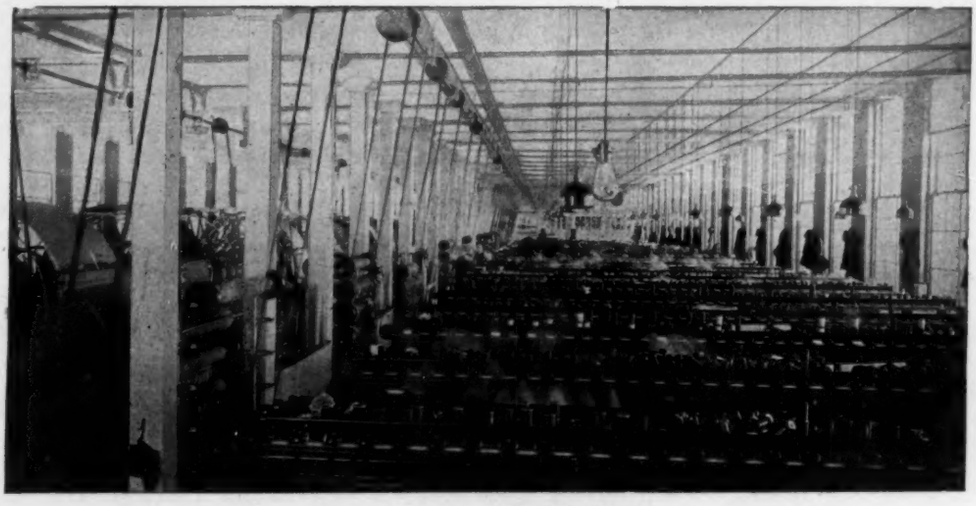
CHAFFEE'S MILL WHITE

A PERMANENT LIGHT-DIFFUSING PAINT FOR THE FACTORY INTERIOR
ADDED LIGHT—LOWEST ULTIMATE COST—SANITARY FINISH



Interior View of Textile Machinery Plant.

Wouldn't it pay you right now to investigate the merits of this Sparkling, Shadow-chasing White Paint, which has proven its efficiency in hundreds of the largest mills? What we have done for others we can do for you.



Interior View of Silk Mill.

WRITE TODAY for Descriptive Booklet and Paint Panel

Thomas K. Chaffee Co. Providence, R. I.

CHAFFEE'S MILL WHITE MAKES DARK CORNERS LIGHT

New Spinning Ring and Traveler

At last an oiled spinning ring. The common ring cannot be oiled and holds back speed, wears fast, makes poor yarn. The Union traveler is a complete circle, **self-oiled,** floats in an air-raceway, runs true and easy at 1,000—2,000—3,000 or 4,000 turns faster than the common traveler, lasts a year, breaks few ends, and spinner can tend 1,000 spindles with less trouble than now. Also the Union rings and travelers when **run at common speeds,** make stronger, better and evener yarn than common rings.

RING IS SIMPLE—HAS ONLY ONE MOVING PART.
The rest is merely a case for the traveler.

UNION

Ring Assembled Complete.
(Patented)

UNION

Floating, Self-Oiling, Air-Cushioned, Durable Traveler. (Patented.)

Southern Manager, F. R. Chadwick, Charlotte, North Carolina.
For detailed information, proofs and tests write to

Union Mfg. Co., 21 Doane Street, Boston, Mass., U.S.A.

WE SAVE
THE LIVES
OF
CAMS AND ROCKER SHAFTS

WE MAKE THE OLD ONES AS GOOD AS NEW

In ordering new Looms specify that they be equipped with our devices.

CLINTON CAM COMPANY, CLINTON, S. C.

How Other Men Manage

Practical Discussions by Cotton's Readers on all varieties of Mill Subjects

Some Questions for Discussion.

EDITOR COTTON:

At the recent meeting of the Southern Textile Association at Columbia, S. C., there were one or two subjects discussed upon the floor of the Convention that seemed to me to be of exceeding interest. Because of that I am going to submit these questions to your department entitled "How Other Men Manage," in the hope that the further discussion thus brought about will be of even more value than the verbal discussions at the convention, because the men taking part therein will be writing their discussion instead of talking on their feet, and thereby give the subjects more mature thought.

The first subject may be put in the form of a question. What is the best distance to set the feed plate from the licker-in on the cards? Why?

The next question is—What is the cause of reedy cloth on low count goods, say 38's to 44's reed and the same pick? How can such reedy cloth be overcome? Why should it seem more prevalent when using steel harness than when using cotton harness?

I trust the readers of this department will discuss both these questions from all their angles, giving their reasons in full. F. T. (S. C.)

Criticism.

EDITOR COTTON:

Criticism or fault finding is one of the most common and one of the most abused things in the mills today. The owners or the agent criticises the superintendent, and so on down the line.

There are two kinds of criticism; one perfectly welcome and helpful, and the other just the opposite. The first, might be called constructive or instructive criticism; and the second, destructive criticism, this latter always harmful and never welcome.

Constructive criticism is the kind that constructs at the same time it destroys; giving something in place of that which is wrong.

Destructive criticism is the kind that, while it destroys, offers no remedy or suggestions for betterment.

For example, a superintendent finds something wrong, and one usually can. This superintendent picks the present system apart, but does not tell how it should be done, and is just as liable to come back the next day and repeat. Whereas, if he would say do it thus or so, the men under him would have something to work upon; they would have an idea as to just what he wanted and could plan their work accordingly.

Oftentimes the superintendent does not himself know how the "kink" should be straightened out. In that case he should confine his criticisms to the results and not to the methods.

Again, a man may thoroughly understand what he is talking about, but be afraid to commit himself, because in case anything goes wrong, he will be unable to shift the responsibility.

Some men are satisfied with certain results, while others are never satisfied. The strictest man I ever worked for was the easiest to satisfy, merely because he thoroughly understood his business and explained just what he wanted. If this was done he found no fault, and if it did not go right, he gave other suggestions or listened to mine. Another man I know is just the opposite—finds fault a good deal, but unless pinned right down, will never commit himself. Men under him are never sure they are right, and always have the feeling that whatever they do, he will find fault anyway.

It is easily seen that the first man will get better results in the long run, simply because he has the confidence and respect of the men under him.

Criticism is all right in its place if used properly. No man's work is perfect, especially in a cotton mill, but no one likes to be told his methods are wrong or of no use, without being told why, or given a remedy. It is like walking in the dark after being told you were going in the wrong direction, without being instructed as to the proper course or way to go.

A good deal is being said about the way an overseer should handle his help. Something can also be said about the way superintendents should handle their overseers and second hands. Get. (Mass.)

Making Voile Yarns.

EDITOR COTTON:

I should like to see some discussion in the columns of your paper on the amount of twist to insert in yarns for the manufacture of voiles. I should also be glad to have the discussion go into the breaking strength of the yarn when using different lengths of staple. In other words, what is the effect of shortening the staple on a hard twisted yarn like that used in the manufacture of voiles, within certain reasonable limits? Actor (Mass.)

Wants Information on Yarn Waste.

EDITOR COTTON:

I am very much interested in the subject of the restriction and redemption of cotton yarn waste, and I shall be very glad to have any of the practical readers of this department describe the methods they use, or recommend any sources of information which they think will be of value.

Hat (Conn.)

More About Card Setting.

EDITOR COTTON:

When setting the cylinder screen care should be taken to only loosen the bolts passing through the side arches, and not loosen the arch bolts. Set the cylinder screen further from the cylinder at the front than at any other point, the reason for this setting is so that the long fibres that escape the wire teeth of the doffer will not come into contact with the front edge of the screen, and thus be removed from the cylinder to the floor.

The front edge of the cylinder screen should be set at 25-1000, the center at 30-1000 and the back at 11-1000 of an inch. The reason for setting so close at the back of the cylinder screen is the same as for setting the front edge of the licker-in screen, that is, to destroy the draft caused by the high velocity of the cylinder.

The setting of the front knife plate is important, and like the nose of the licker-in, should be set according to the length of staple run. When running a long, clean staple, set the front knife plate so that the strippings from each flat are all one thickness and held together by fibres here and there. It should be remembered that the amount of flat strippings depends to a great extent on the setting of this plate. If the plate is set too close, some of the short fibres and foreign matter removed from the cotton by the flats and by the help of the knife, the cylinder will carry to the doffer, thus producing bad work.

As stated before, it is by watching these settings that the overseer in charge can save many dollars for his company. Why not do it? It is just as easy to set the plate right as wrong.

The back knife plate is seldom, if ever, set by any grinder or overseer, because this plate once set, is never disturbed. However, it should be examined to see if it is properly set, which should be 17-1000 at its lower edge and 32-1000 at the upper edge. The reason for setting the upper edge of the back knife plate away from the cylinder is to give the cotton, conveyed to the cylinder in a matted state, a chance to free itself and stand out a little from the cylinder before coming in contact with the flats.

The flat stripping comb should be set at 8-1000 gauge, and care should be taken that it is not set so close as to come in contact with the wire on the flats, because this is liable to damage the comb as well as the wire on the flats. Nothing looks so bad in a card room as the flat stripping comb held in one position for a time by striking the flats, or the comb marking and holding the flats so as to give an intermittent action.

When setting the doffer comb the blade should be brought at its closest point to the cylinder and then set to 10-1000 gauge. When the web follows the doffer, as is the case in cold weather caused by the room getting cold, the comb should be raised a little and set to 8-1000 gauge. In the summer when the web is sagging, the comb should be lowered and set to 10-1000 gauge when a very heavy lap is run. Sometimes it is impossible to stop the sagging, and the only remedy is to make a tighter lap. When setting the doffer comb, great care should be given that the teeth of the comb do not come into contact with the wire teeth or parts of the doffer, because it will roughen the teeth of the doffer comb to such an extent that a few fibers will continually collect at all the rough places on the comb and continually break the web down. Another point that should be considered when setting the doffer comb is to be careful and see that all the posts holding the comb blade to the comb are the same length. The writer has seen mills where it could be seen that some part of the blade of the doffer comb was striking the wire, while in other places part of the web would follow the doffer, owing to the posts being of different lengths.

The first thing to do before grinding the card is to determine whether or not the wire is plough ground, so as to be able to test the wire when it is supposed to be sharpened. A good method to ascertain whether the point of the wire is ground properly when the wire is plough ground on both sides, is to pass the finger nail over the points of the wire. If the wire points bite the finger nails, this indicates that the point of the wire is in proper condition. When the wire is not plough ground, or plough ground only on one side, the points of the wire do not bite the finger nails as readily as the wire plough ground on both sides. The manufacturers should be careful when selecting wire fillet and examine the point of the wire with a strong magnifying glass to ascertain if the wire is plough ground on both sides. Wire not plough ground, or wire plough ground only on one side should not be accepted, because, as I understand it, plough ground wire is to be preferred on account of its specially shaped sides having a better opportunity for holding the fibers until they are straightend. So when the wire is plough ground only on one side, only one half the benefit is obtained. Again, as I have pointed out, to have good carding, a dual operation must always be going on between the points on the cylinder and flats holding the fibers for a certain length of time. It can be seen by handling the wire plough ground on both sides that the fibers are held until they are straightened, thus the fibers are laid in parallel circumferential lines and deposited on the doffer while in this condition, which is the basis of strong yarn.

Before explaining the proper method for grinding a card, I wish to state that the time for grinding a card is much misunderstood, because some wire needs grinding every two weeks, while other kinds of wire needs grinding only every two months. Here is where a good grinder or a good overseer is valuable to a plant when he is able to judge the quality and temper of the wire. In grinding, no special time can be given. Grinding must always be controlled by sight, ear and touch. It should always be done lightly and carefully so that the top edges of the wire will form something like the cutting edge of a chisel. But on account of the lateral motion of the grinder, the side edges will be ground off, leaving nothing but the sharp points. On the other hand, if the grinding is done in a hasty and careless manner, the points of the wire are roughened, which cause them to hold the fibers. From this the harm caused by heavy and careless grinding may be realized, because when the points of the wire cling to the fibers, they carry many long fibers past the doffer and around a second time, thus injuring the fibers. Also, at stripping time the card wire is not stripped as clean, because the wire points clinging to the cotton make this impossible.

Ted, (N. C.)

The Renfrew Manufacturing Company on November 1st paid a quarterly dividend of 1 per cent on its common stock to stockholders of record of October 26th.

Keeping Even Numbers in the Card Room.

EDITOR COTTON:

I had a very interesting talk a short time ago with the superintendent of a northern yarn mill about keeping numbers in the card-room. He gave an experience he had while carder in what is perhaps the finest mill in the country. As it was like an experience I once had myself, I'll pass it on as the readers of this department might find it interesting.

He had particular reference to the speeders and told what he did after taking charge of the card room. The mill he spoke of makes very fine yarn and has always been very particular about sizing. At that time they were having trouble and could not seem to locate the cause. The superintendent told him of this and said that he believed the trouble to be in the picker room and drawings, as they had a very good man on the speeders and did not think the trouble there. He practically gave the carder to understand that he was to leave the second-hand on the speeders alone and try and find the trouble elsewhere.

He started in with the picker-room and worked along making what changes he thought necessary, but the sizing did not improve to any great extent. After working as far as the speeders without finding anything very much wrong he started to investigate and see what he could find there.

To his surprise he found the fixers with a draft gear in their hands changing a frame here and there all day long. Their routine work, such as changing rolls, scouring, etc., had been entirely neglected, because they spent all their time changing gears. He let things go the rest of that week and on Saturday afternoon had the second-hand and fixers stay in and he started through the frames taking the slubbers first.

They found draft gears on frames running the same hank roving varying from one to three teeth, and the same on the firsts, seconds and jacks. Making a complete list of every draft gear, tension gear, and twist gear in the room, the following Monday morning he took the slubbers and changed every gear alike on the same hank roving and kept them that way. After following this up through to the jack-frames, he found his sizing improved fifty per cent.

Their system of sizing was quite complete as every speeder was sized once each day. What had caused the trouble was simply because, as one speeder became light or heavy, either because the roving was smaller in the creel, or because the four bobbins the girl happened to pick up were light, that individual speeder had to be changed and perhaps before it came time to size again, it was too heavy or vice-versa. By doing his changing on the slubbers and firsts, he eliminated almost all changing on the fine speeders. I have seen some sizing reports from that mill and they were as nearly perfect as it is humanly possible to make them.

Of course this was in a mill with fairly new machinery and all the same kind and under very good conditions. But the same principle can be applied to any mill to the benefit of the sizing. From the drawing frames on I have seen this proven and believe the less changing one does the better results will be obtained. E. T. G. (Mass.)

Harding Tilton & Company announce the removal of their office to 320 Broadway, New York City.

Balance Twist.

EDITOR COTTON:

I see an article in the September issue of COTTON by "B. T. (S. C.)" desiring to know how to make balance twist yarn. I have made balance twist and will gladly give "B. T." the rule I use if it will be of any use to him.

He has given two examples to work from, but they show an excess of twist in both single and twisted yarn. However, I will use them to illustrate the rule. The rule I have always used is as follows:

1st. Find the twist per inch in the single yarn.

2nd. Find square root of the number to be used in the yarn.

3rd. The twist per inch ÷ the square root = the factor for single yarn.

4th. Find the number of the yarn to be twisted.

5th. Find the square root of the number to be twisted.

6th. The twist factor for single yarn, less 25 per cent = the twist factor for twisted yarn.

7th. The square root of the yarn number to be twisted × the twist factor for the twisted yarn = the twist for the twisted yarn.

8th. The twist constant of the machine ÷ the twist for the twisted yarn = the gear.

Now I will work the example "B. T." has given, but will have to substitute the twist in the single yarn to illustrate the rule I have given, but will work it later from the way "B. T." has given it to show the difference.

40's single 57.74 twist per inch (substituted).

$\sqrt{40} = 6.3245$.

$57.74 \div 6.3245 = 9.13$, the twist factor for single yarn.

40's 3-ply = 13⅓, the yarn to be twisted.

$\sqrt{13⅓}$ yarn = 3.6515.

9.13 the twist factor of the single yarn × 75 per cent = 6.85 twist factor for the twisted yarn.

$3.6515 \times 6.85 = 25$ twists per inch for the twisted yarn.

The twist constant of the machine ÷ 25. (twist per inch) = the gear.

Second Example. 50's single 56.57 twist per inch (substituted). $\sqrt{50} = 7.071$. $56.57 \div 7.071 = 8$, the twist factor for the single yarn. 50's 2-ply = 25's yarn to be twisted. $\sqrt{25} = 5$. Then, 8, the twist factor of the single yarn × 75 per cent = 6, the twist factor for the twisted yarn, and the twist constant of the machine ÷ 30 (the twist per inch) = the gear.

Now I will try and work the example that "B. T." has given to show the difference, which I think is much larger and not so easy to understand. The 40's 3-ply having 25 turns, what number of turns should go in the single yarn?

The 40's 3-ply = number 13⅓ yarn to be twisted. $\sqrt{13⅓}$ yarn = 3.6515. 25 twists per inch ÷ 3.6515 = 6.85 twist factor for the twisted yarn. 100 per cent = twist factor for the single yarn. 75 per cent = twist factor for the twisted yarn. Then 1 per cent = 1/75 of 6.85 (twist factor) = .0913, and 100 per cent = 100 × .0913 = 9.13, twist factor for the single yarn. As $\sqrt{40}$'s single yarn = 6.3245, then $6.3245 \times 9.13 = 57.74$ twists per inch in the single yarn, and the twist constant of the machine ÷ 57.74 (twist per inch) = the gear.

Second Example. 50's 2-ply = number 25 yarn to be

twisted. √25's yarn = number 5 yarn. 30 twists per inch ÷ 5 = 6, the twist factor for the twisted yarn. 100 per cent = twist factor for the single yarn. 75 per cent = twist factor for the twisted yarn. Then 1 per cent = 1/75 of 6 (twist factor) = .08 and 100 per cent = 100 × .08 = 8, the twist factor for the single yarn. As √50's single yarn = 7.071, then 7.071 × 8 = 56.57, twist per inch in the single yarn, and the twist constant of the machine ÷ 56.57 (twist per inch) = the gear.

H. E. W. (Maryland.)

Combing.

EDITOR COTTON:

Before cotton can be combed it must be placed in a suitable form for the combing machine and for this purpose the sliver lap machine is used. Some mills have sliver and ribbon lap machines and other mills also have drawing. Much could be said in favor of either equipment; the silver lap machine, while not producing a lap quite as even as the ribbon lapper, has not so great a tendency to split when being unwound on the comber as is the case with the ribbon lap. The writer can see very little difference in either equipment when the additional cost of the ribbon lapper and the cost of operation is taken into consideration. If I have any personal favor for any one equipment over the other, it is the one without the ribbon lapper.

The proper adjustment of the stop motion spoons is very essential in the making of good even laps. The proper adjustment of the sliver conductors and guide plates, so that a good selvage will be made, and the proper adjustment of the racks so that they will be perfectly plumb and level is also necessary. If the racks are not plumb and level they will cause the plates to bind on the edge of the fluted calender roll and make an imperfect lap. Care should also be taken not to allow oil to get on the brake shoe.

The ribbon lap machine is, so far as adjustments are concerned, practically the same. The comber is the invention of M. Heilmann, of Mulhouse, Germany, and although there are many improvements added by other inventors, his type of machine is still referred to as the Heilmann comber. Each head is complete within itself, but as the motion for all heads derive their power from the same source, it is necessary that all corresponding parts of each head act at the same time, for if all heads do not act at the same time, some heads will not be doing their combing properly.

The top comb is constructed with one or two rows of needles. This is a matter of preference, but the writer would prefer the comb with one row of needles, for the comb with two rows has a tendency to catch foreign substances between the rows of needles, and later this dirt is dropped into the combed cotton; also the comb with two rows is more liable to come in contact with some of the moving parts during piecing up.

The web should never be so slack that it will fall on the bottom of the pan nor should it ever be so tight that it will be strained.

Combers are also made single and double nip. The double nip comber, while producing a greater amount of work, does not get the quality that can be produced from the single nip comber, therefore, where a first class yarn is wanted, it is more desirable to use the single nip machine.

Setting and timing the comber is very important and should be done by a good reliable man and one that knows the importance of good timing and setting. In order to have the cylinder and delivery roll in their proper relative positions it is first necessary to line up the delivery roll, and after the delivery roll has been made fast in its bearings, other settings may be carried on, using the delivery roll as a basis for certain settings.

The fibers are combed first one end and then the other, in other words, the front fringe of cotton that is held by the nipper knife and cushion plate is combed by the action of the half lap and as the cotton is carried forward by the detaching roll and the fluted segment it is drawn through the needles of the top comb thereby receiving the combing of that part of the fibers that was not combed by the half lap. We might say that the front fringe of the fibers is combed by the needles of the half lap being drawn through them, and that the ends of the fibers that are passing through the comber are combed by being drawn through the needles of the top comb. Honest Bill (Ky.).

A Spinning Room Kink.

EDITOR COTTON:

The other day the man in charge of the ring spinning came to my office with what he thought was a problem.

It seems that in the morning of the same day, a cylinder head became loose and was taken to the machine shop for repairs. At 11 A. M. the cylinder was ready, and at 1:30 P. M. the frame was banded and ready to start. But it was found impossible to move the cylinder with the power. To make a long story short, the master mechanic and spinner worked until about 4 P. M. removing and adjusting the boxes, etc., without success.

The trouble was that the same person put all the bands on and tied every knot on the driving side of the spindle whorl. This was what held the cylinder.

While banding a cylinder, two persons should do the work, one on each side of the frame and at the same place, so that the tension or pull on the cylinder will be the same and not get the cylinder out of alignment, and to be sure and have all knots on the driven side of the spindle whorl.

Wash. (N. H.)

One of the first holiday souvenirs to reach the editor's desk is a vest-pocket note book for 1917, which is being sent out by M. P. Thompson, Manufacturers' Agent, handling mill and builders' supplies and located at Charlotte, N. C. This little note book contains on its inside covers, calendars for 1917 and 1918, and the usual assortment of informative facts, as well as its blank pages for memorandum purposes.

"Better Production From Textile Machinery" is the title of a handsomely illustrated 70-page booklet recently issued by the S. K. F. Ball Bearing Company of Hartford, Conn. This booklet was printed by Harper Brothers, of New York, and is a splendid illustration of the printing art. A copy will be forwarded to any textile manufacturer interested in securing better production from the machinery in his factory.

KNITTING SECTION

The Attention of all Manufacturers of

WOMEN'S HOSE

is invited to our new

Fashioned Welt Machine MODEL K

This Machine produces women's hose with an inturned knitted welt similar to that produced on full fashioned machines. The machine has all the features of our other Models—each stocking being dropped from the machine complete, except for the looping of the toe. It is fitted with five yarn changing fingers, inserts an "anti-run-back" course, and the welt being knitted on the machine, has all the elasticity of the fabric and may be made as wide as desired.

Write for samples and further information

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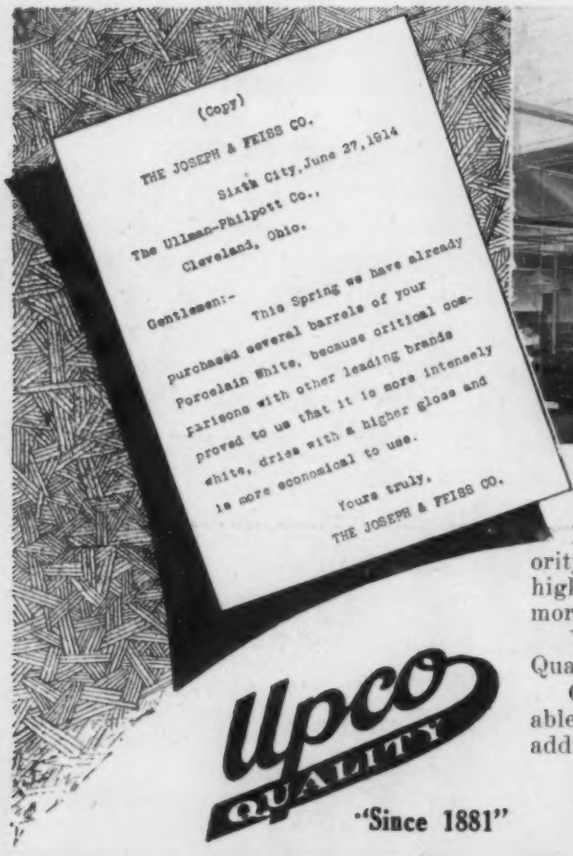
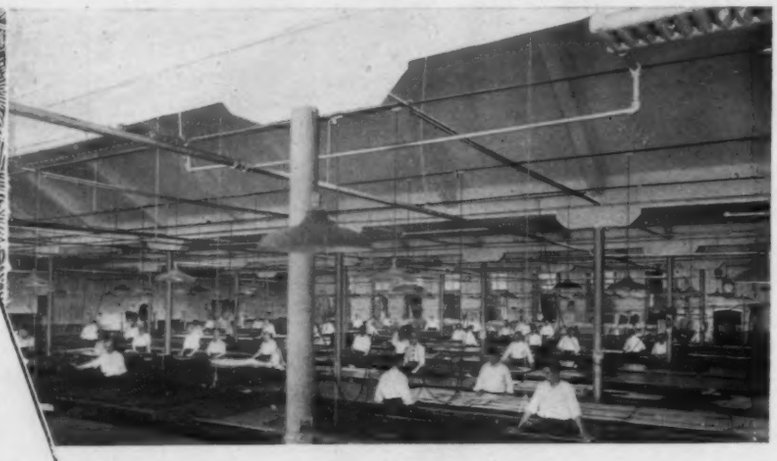

(Copy)
THE JOSEPH & FEISS CO.
Sixth City, June 27, 1914
The Ullman-Philpott Co.,
Cleveland, Ohio.
Gentlemen:-
This Spring we have already purchased several barrels of your Porcelain White, because critical comparisons with other leading brands proved to us that it is more intensely white, dries with a higher gloss and is more economical to use.
Yours truly,
THE JOSEPH & FEISS CO.



Upco QUALITY

"Since 1881"

Some Evidence of Upco Superiority

Every comparative test has proved beyond a doubt, the superiority of Upco Quality Mill White—has proved that it retains its high snowy gloss longer, no matter how often washed—that it is more economical to use.

Why not light up your dark walls and ceilings with Upco Quality?

Our booklet, "Light Without Power" is interesting and valuable. Where shall we send your copy? Just put your name and address on a post card and address it to

The Ullman-Philpott Co.

Industrial Paint and Varnish Laboratories

Cleveland, Ohio

Calculations for Knitted Fabrics

BY WILLIAM DAVIS, M. A.

Warp Loom Cost Accounting.

These calculations are of the greatest necessity for the production of warp loom fabrics in the factory. For example it is sought in a well regulated establishment to know beforehand how much material is required for any given warp, and these weights are supplied to the warper from which to produce his warp. If he is given a "Carte blanche," then experience shows that all kinds of excesses are liable to spring up, the chief feature noticed being the increase in the quantity of waste made. When giving out the quantities of materials a check is at once put on waste by the supervision involved. When yarn is bought in from outside sources, it is of the greatest importance that for a given order or contract the manufacturer should be able to estimate the approximate requirements so as to reduce the weights left over to a minimum. But it is also for the purpose of cost accounting that these calculations are required, for once the weights of all the materials are known, then the system of arriving at the prime cost of the fabric is quite regular and based on the average expenses of the various departments, calculated over a given period of time. Such fabrics are often sold by the weight per yard of a given width and when the weights of the material in a given length are known, then the weight per yard finished can be obtained with little further effort. To demonstrate this we shall take an example of a warp used for a shawl fabric where the ground of 2/24's worsted counts is embellished with a number of threads of chenille equivalent to 1½'s worsted count and 60/2-ply spun silk yarn.

Example 8. Warps: 48 threads of 1½'s worsted Chenille at 1.5 dollars per pound, 200 yards long. 1200 threads of 2/24's worsted ground at .75 dollars per pound, 120 yards long. 72 threads of 60/2-ply spun silk (4 as 1) at 3.50 dollars per pound and 150 yards long. We calculate the weight and cost of each of the elements in turn and afterwards add together the results. Chenille: $48 \times 200 \times 2 \div 560 \times 3 = 11.4$ lbs. at \$1.50 = \$17.10. Ground: $1200 \times 120 \div 12 \times 560 = 21.4$ at 75c = \$16.05. Silk: $72 \times 4 \times 150 \div 60 \times 840 = .85$ lbs. at \$3.50 = \$3.00. A total of 33.65 lbs. of material for \$36.15.

Example 9. This example is taken from an actual warp loom fabric used for a fancy shawl for evening wear. The whole fabric is made in a light gauze stitch and the groundwork in plain lap is made up of 2/30's worsted counts, soft spun at \$1.25 per pound. This is used in certain parts with a portion of color introduced as mercerized cotton in blue and yellow, the former at 50c per pound and the latter at 65c per pound. On this ground is placed a characteristic effect made from thick, soft spun, single yarns of 6's worsted counts at \$1.50 per pound, and this is introduced to cover approximately half the extent of the fabric, the guide bar in which it is placed being made to take large zig-zag laps in the vertical direction. The thick soft yarn for the most part floats loosely on the surface and is only drawn into the ground at given intervals in order to intersect and have its position secured. These bands of thick soft white materials are bounded by single threads of highly colored chenille at \$1.75 per pound and of a count equivalent to 4's worsted. The color scheme of the chenille follows a very fancy style, being half made up of white, with the other half equally divided between a bright yellow and a soft green tinged with black. There are only two of those Chenille threads in the pattern but on account of their bright hue they give to the whole fabric a touch of brightness and attractiveness. The function of the thick single spun yarn is also a very important one, for it is to these that we have to look to give a fabric otherwise light and gauzy, its handle and bulk. There are only one-sixth of the threads here to what we have in the number of yarns in the ground, but soft thick threads give a greater aggregate weight. The pattern is given herewith but it must be borne in mind that the whole warp is subjected to a sidewise lap; all the points of the ground move one needle space to the right for 8 courses and then return to their former position of starting, one needle space at a time. Along with this sidewise movement is formed the characteristic warp loom stitch which in a way corresponds to the knitting operation in its general features and all these things combine to give the fabric a unique place in the textile market. This place is sure to become more important in the near future when the usefulness and attractiveness of the resulting fabrics come to be more fully realized. The pattern is as follows as it would be produced by the warper:

		Totals
2/30's worsted (A) ground white.	4 1 1 2 4 . . 4 . . 4 4 1 1 4 1 1 1 1 1 1 1 4 6 —	48
6's single (B) worsted overlap.	. . . 1 . 1 1 1 1 1 1 . . . 1 1 1 1 1 1 1 1 . . . —	15
Blue mercerized (C) fancy 2/20's.	1 1 . . . . . 1 1 . . . —	4
Yellow mercerized (D) fancy 2/20's.	. . . . 1 1 . 1 1 . . . . . —	4
Chenille (E) 4's Worsted.	1 1 . . —	2

The pattern is made to occupy 8 inches of points in the loom and the total width is 72 inches so that this provides for 9 repeats of the entire pattern. If, therefore, the number of threads of each constituent be counted from the color scheme shown, these numbers multiplied by 9 will give the total individual threads of each color in the cloth, which particular is essential before the calculation of the weight and cost can be proceeded with.

Taking the materials from A to E and adding the number of threads found opposite them on their respective lines we obtain the following: $A = 48 \times 9 = 432$ threads total. $B = 15 \times 9 = 135$ threads. $C = 4 \times 9 = 36$ threads. $D = 4 \times 9 = 36$ threads. $E = 2 \times 9 = 18$ threads.

The various constituents of the fabric require to be beamed corresponding to the amount of take-up which the pattern compels them to draw. Thus if all the yarns were to be placed on one and the same beam in the loom, it would be impossible to draw from the soft yarn the length required to give the effect on the face of the cloth. At the same time it is not desirable to multiply the number of beams more than is necessary, the fewer the number the better.

Sometimes it happens that when a soft elastic woolen yarn is used in the ground, along with a harder and less elastic mercerized cotton thread, that the latter works much tighter than the woolen and the appearance of the fabric suffers if we persist in working them together on the same beam. This difference in material may cause different degrees of take-up even when the intersections of the respective yarns are identical in the fabric. In this example, let the fabric be given as 100 yards long when out of loom and for this we require 300 yards of the 6's and 4's, whilst for the remaining materials a warp of 150 yards is necessary. These particulars complete, we are now able to compute the weight and cost of the various materials thus: (A) $432 \times 150 \div 15 \times 560 = 7.7$ pounds at \$1.25 = \$9.62. (B) $135 \times 300 \div 6 \times 560 = 12.00$ pounds at \$1.50 = \$18.00. (C) $36 \times 150 \div 10 \times 840 = .70$ pounds at \$0.50 = \$0.35. (D) $36 \times 150 \div 10 \times 840 = .70$ pounds at \$0.65 = \$0.45. (E) $18 \times 300 \div 4 \times 560 = 2.4$ pounds at \$1.75 = \$4.20. Total 23.5 pounds, which cost \$32.62. $23.5 \times 16 \div 100$ (yards finished) = 3.76 ounces per yard, and $\$32.63 \div 100 = \$0.33$ per yard.

These give the finished particulars on a basis of 100 yards out of the loom, but this length may of course vary according to the nature of the treatment accorded in the finishing operations. Materials of this woolen nature and so slack spun, require to be treated in the finishing very carefully, for prolonged presence in scouring of any harshness in this operation will cause an excessive shrinkage which may do serious harm and spoil the total effect. Where possible clean yarns should be used and full precautions taken by the manufacturer to avoid the fabric coming into contact with grease and dirt. If this is done, the fabric should be made ready for the market with a very light treatment in the scouring liquor. Also the cost as figured out in the scheme shown is that for materials and to arrive at the full estimate many other details would require to be added. For example the charges for labor would figure prominently and the first items would be the amounts allowed for winding the yarn and making and beaming the warps. Then the amount paid to the frame worker would require to be added; items which are readily obtained from the rates of payment given for such work in the factory and the statement of prices would require to be consulted. To this would require to be added a percentage for superintending and for selling expenses of travelers on the road. Interest on share capital, depreciation, wear and tear of machinery, allowances for rent and taxes, insurance, and profit would all have to be added to the amount shown before the final selling price could be arrived at with accuracy. In the case of overseers, expenses for warehousing and items such as scouring, the percentage is arrived at by taking the cost of each department over a certain period such as a week or month and dividing this over the average production of the department for a like period.

In connection with a large pattern with which we have just dealt, it is necessary to see that the pattern starts and finishes properly at the edges so as to give the best result to the eye. Usually this is done by selecting some prominent colored feature and arranging to have this an equal distance from each side. It is, for example, distinctly displeasing to the eye to have on the right side of the cloth about 4 inches of plain ground and at the other side to find a prominent colored feature of the design only one inch from the edge. This is an easy matter when the pattern repeats itself over the fabric an even number of times, for it can be arranged to have only half the pattern at each side which will bring the prominent feature at an equal distance from each edge. If, however, the pattern does not come out exactly, the difference is halved and that number of threads added on to the ordinary starting point.

Should Knit Goods Manufacturers Advertise?

BY RALPH H. BUTZ.

It is a well known fact that many manufacturers of good merchandise in all lines advertise their product direct to the consuming public and thereby create a demand. Manufacturers of shoes, hats, clothes, machinery, and a thousand other varieties of merchandise are branding their goods with trade marks and spending large amounts of money in making their names well known to the public. But it seems that the manufacturers of textile fabrics have not yet realized the benefits that accrue from advertising, for those that do advertise are few in number.

There is no line in which it is more necessary for the manufacturer to advertise than in the textile line, no line in which the benefits would be greater. To advertise successfully is to create a demand for trade-marked materials, and when there is a demand there is work for the manufacturer. That is the reason why the mills that make advertised fabrics are usually running full time when other mills have to close on account of poor business. "No orders ahead" is not the slogan of the advertiser.

Some manufacturers may say that there will soon be too many that advertise their product, and that no one will get any benefits from the advertising, and that this field will be too overcrowded for people to notice advertising then. Would not this argument apply to all forms of advertising, and is it not essential that in the present era we all advertise in some way? Every department store in the cities advertises, no matter how many there are, and still they are all convinced that advertising pays.

Many years ago a certain gentleman named Malthus proved by indisputable figures that if people didn't stop having children so recklessly the time would come when there wouldn't be room on this terrestrial globe to hold us all. Malthus worried about this little problem a good deal, and he spent a good part of his time preparing tables and statistics to prove the validity of his theory. There are more people on the earth today than he calculated there would be, but there is just as much room, apparently, as there ever was. People are crowded only when they choose to exist that way. The manufacturer who believes that there is no more room to advertise his product is in the Malthus class.

The great object of all direct-to-the-public advertising is to create a demand for a certain brand of goods. To be successful the goods must be trade-marked and be branded with a name that is easily remembered and has those qualities that tend to make it popular. There is more in a name than many people imagine. A poor name may be enough to destroy otherwise good advertising. Trade marked goods should have the trade mark on them plainly so that the buyer can easily see it and know where to

Circular Rib Knitting Machinery

PRODUCTS

Underwear, Sweaters, Cuffs with Cut Welt, Selvage, or French Welt, Mantles, Collarettes, Toques, Golf Caps, Hosiery Tops, Skirts, Borders, Corset Covers, Button Stays, Mittens, Bandages.

FEATURES

Rectangular Slots, Hardened at Bottom, Sectional Caps and Cam Rings, Hardened and Ground surfaces, Sensitive Take-Ups, Two Speed Drive, Dogless Attachment, Positive Pattern Mechanism, Needle Guard and Protector, Automatic Stop Motions, Electric Cloth Cutters.

Characteristics

The characteristics of a knitting machine, like those of an individual, are determined by its origin and history; just as knowledge of the individual's family, schooling, and early life are desirable for the formation of an idea of his characteristics, so knowledge of the plant, personnel and ideals involved in the construction of the knitting machine are necessary for an understanding of its merits. Investigate the origin of our knitting machinery.

Wildman Mfg. Co.

ESTABLISHED 1889 **NORRISTOWN, PENN.**

look for it. Fabrics should have the name woven into the edges wherever possible, and garments should have labels attached at conspicuous places.

In an advertising campaign it is essential that every department of the business be in close cooperation with the advertising department. This is especially true of the sales department. When a demand has been created for a certain brand of goods, it is the business of the sales department to make every effort to place the merchandise with the retailer that the demand for this goods will be satisfied. To illustrate this lack of cooperation among the different departments there occurred quite recently an illustration.

A manufacturer of underwear was successful in obtaining a government contract for large quantities of his product. Of course, his goods were selected only after exhaustive tests had been made and the superiority of his product had been effectually demonstrated. The manufacturer at once realized the value of this contract as an advertising argument, and arrangements were made to launch a forceful advertising campaign.

A series of attractive and interesting advertisements was prepared and placed in newspapers and magazines. As a direct result of this advertising an actual demand was created. But the sales department had neglected the opportunity. In various cities inquiries were made to retailers concerning this brand of merchandise, but the merchants were ignorant. The goods had not been offered to dealers, people could not procure them, and as a result the money spent on advertising was wasted.

When the manufacturer decides to launch an advertising campaign to popularize his product he should take thorough steps to support the advertising. Several weeks before the advertising is placed the sales department should be furnished with copies of the adverisements and the plans of the campaign. The salesmen should take copies of the advertisements to convince the retailer that there will be a demand for the goods, and with such an argument the majority of merchants will buy, because it is the merchant's business to supply the wants of his trade. The retailer should be furnished with effective window cards and displays to supplement the newspaper and magazine advertising. In this manner only can the full results be secured.

Many manufacturers have tried advertising and have condemned it as a failure. They have not sought the real reason why it was a failure. Their plans were not complete, and they had not developed the efficient system that is required in such a campaign.

There is a widespread opinion prevailing that when advertising is mentioned a campaign of national dimensions is meant. While such a campaign would be desirable were the money readily procured, it is not the manner in which most large campaigns are started. It is better to advertise thoroughly in one state, than to advertise intermittently in different parts of the country. The effects of advertising are cumulative and once it is begun it must be adhered to as closely as possible.

The best way to obtain and then hold the Paraguayan trade in cotton goods would be by the introduction of the goods by a traveling salesman who would appoint a local representative there.

The Knit Goods Market.

Prices of cotton knit goods have been forced to a level where it might be supposed bullishness would yield to reason. Yet there seems to be no let up to the phenominal demand and the eagerness for advance delivery.

Indications of scant supplies of hosiery and underwear for spring are more pronounced than at any time in the past, and are further emphasized by the fact that mills are clamping the lid down tight on the order department.

To quote an underwear manufacturer who is accepting no additional duplicate orders, mills have quit doing business and are devoting their energies to despatching that which is on their books.

As evidence of the fear among jobbers that deliveries for spring will fall short of orders, merchants are, and for some weeks have been calling for advance shipments and are asking for no interest rebate for anticipated payments.

Much of the duplicate business that is being offered is believed to be precautionary, buyers taking the stand that it will be wise to fortify against any possible delinquency on the part of sellers.

Even conservative interests, while enjoining extreme care in making yarn commitments beyond requirements anticipated on a reasonable basis, admit that every pound of yarn bought today can be sold in the finished product at prices based on present yarn costs. It is common belief in the knitting trade that even though cotton were to go off five cents a pound or more there would not be enough yarn to go around, and some manufacturers look for radical jumps within the next few weeks.

While no one questions the seriousness of the knit goods situation from the buyer's standpoint, some southern underwear mills are reported to have named prices for next Fall that are unnecessarily low. In contrast, a Pennsylvania manufacturer of medium weights, who declined to show samples or name prices at the opening in November, has advised his customers that his line, which last year went to the jobber at $4.50 a dozen probably will have to be left out of consideration at less than $6.50 for next Fall.

One effect of the formation of the open price association by New York state manufacturers is to make those in Pennsylvania less timid about holding out for a profit. A mill in the Schuylkill Valley, whose executive says he was misled by competition last spring named and adhered to prices so high that he acquired little business. But as he has 40,000 pounds of yarn that shows a profit of 15 cents a pound over the contract price, he should come out well ahead of his rivals in either the sale of the yarn or manufacturing for spot delivery.

The Pennsylvania underwear manufacturers, at their November meeting, in Reading, were practically in accord on the safety of adherence to a policy based on the assumption that yarns have not yet reached the crest.

That spinners are not pressed for funds is indicated in the declination to accept anticipated payments. One underwear manufacturer who had sent his check for approximately $3,000 for a future shipment, rebating to himself interest for 30 days, was surprised to have it returned with the polite explanation that the seller was not disposed to pay for the use of money not yet due. Several other instances of this kind that have come to light con-

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Builders of
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Rib Knitting Machinery

For Knitting the Latest Style Fabrics FOR

Jackets, Borders, Etc.
Underwear, Sweaters, Toques, Cardigan

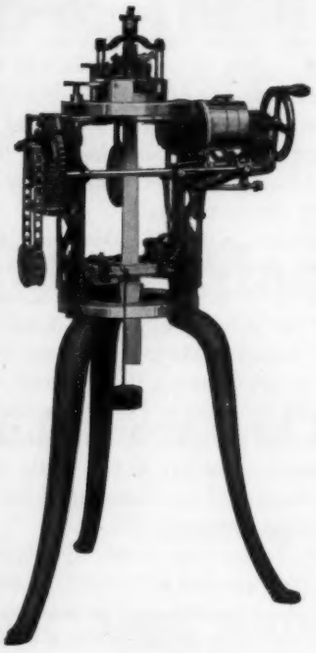
Also Builders of
Napping Machines

The Stafford and Holt Pineapple Stitch Machine is the Latest.

Write for Descriptive Circular.

Little Falls, New York

H. BRINTON CO.



Builders of
Circular Knitting Machinery
of every kind for every purpose

Hosiery Ribbers
with the very latest attachments

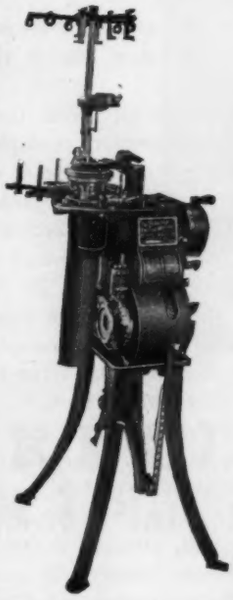
Full Automatic Hosiery Footers

Body Machines, Sleevers, etc.
for Underwear, Sweaters, Toques, etc.

Write for Catalog, Prices and Samples.

213-217 Race Street, PHILADELPHIA, PA.
Canadian Agent: Hartley Kay, Ltd., Georgetown, Ont.

New Model Banner

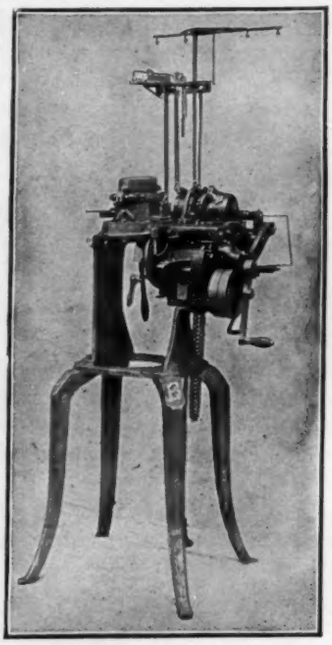


Full automatic hosiery machine, — all working parts accessible from the front of the machine. Five yarn changing levers, high splice and double sole slackening device, high speed in the heel and toe, —Automatic Transferring device. Over 25,000 in successful operation, — Average production 100 machines a week.

Hemphill Mfg. Co.

131 Clay Street, - PAWTUCKET, R. I.

BOSS Full Automatic KNITTER



It will make the neatest, most uniform and most perfect work, and is the most profitable of any knitter on the market.

It has the simplest Automatic Splicer in the world and never causes trouble. All parts are interchangeable. Compact and strongly built. Runs easily and breaks very few needles, seldom if ever requiring repairs.

So simple that an unskilled operator can learn to run it in a day.

The Boss Knitter means more production for the money than any other machine. Investigate.

Send for Particulars.

Boss Knitting Machine Works

Cor. Elm and Reed Sts., READING, PA.

vince buyers that spinners would rather have the yarn than the coin.

Hosiery is in such scant supply that the suspension until January 1st of the prohibition against importations into the United Kingdom created not a ripple. In any event, the resumption of exports of cotton hosiery to Great Britain cannot bring much business to American mills, as, according to forwarders and ship brokers, shipments must be on the dock not later than December 12, as the lifting of the embargo applies to only such merchandise as has arrived in British ports by December 31.

A southern manufacturer in Philadelphia on a needle quest probably voiced the sentiment of most mill executives when he said he hoped the embargo would be maintained, that he was committed for delivery of 10,000 dozen pairs of hosiery to a British house—hosiery that he can sell in the American markets at prices above those named in the Briton's order. "A tight embargo is the only thing that will enable me to make that additional profit," he said.

As previously disclosed, mills are having little regard for contracts with merchants who give them an opening by reckless interpretation of trade terms.

One of the largest houses was receiving shipments against an order on which there was still due from the mill 100 cases of ladies' silk boot hosiery, and in successive remittances appropriated the cash discount after 17 to 20 days, notwithstanding the terms were 3 per cent 10 days.

In explanation, the house stated that the discount period was reckoned from the date of receipt of merchandise. The mill held otherwise, insisting that to get the benefit of the discount the consignee would have to remit in 10 days from date of invoice f. o. b. shipping point, and disclaimed liability for further deliveries.

The jobbers came along with the amount of the discount, expecting a resumption of shipments. The manufacturer's reply was that the order had been cancelled and could not be reinstated for the reason that he had committed himself for delivery of the merchandise to other houses. This house therefore will be short 100 cases of hosiery, except it get the merchandise elsewhere at an advance.

A case in which the spinner was the offender did not terminate so advantageously for the seller. The spinner's monthly deliveries have been less than 20 per cent of contract specifications. The hosiery manufacturer affected protested but remitted with unusual promptness following each shipment, refusing to be badgered into cancelling his order. Meanwhile he placed a contract with another spinner, from whom he is receiving deliveries as per schedule, and next year, in what promises to be a higher market, will be working up low-priced yarn drawn against the first contract.

Instances of the buyer's error in assuming an attitude of defiance toward the seller in the continued advancing market are manifold.

Contributing to the shortage of knit goods is the scarcity of needles, some types of which are practically off the market and in demand at fabulous prices. The National Association of Hosiery and Underwear Manumacturers is advised by the Department of State that Great Britain has declared an embargo on the exportation of latch and spring beard needles, which nullifies the proposition of the British Foreign Office of a month ago that England could supply the needs of neutrals if samples were submitted.

With shipments of German needles in Rotterdam shut off and an embargo on British needles, manufacturers have come to realize that sole dependence must be placed upon domestic manufacturers. Some of these are reported to be repudiating contracts, and suit against one company for damages resulting from non-delivery is threatened.

A southern manufacturer who was in Philadelphia two weeks ago, says he is facing the necessity for shutting down 40 per cent of his equipment. A Philadelphia manufacturer of hosiery who is in want of standard needles is in an even worse plight, to escape from which he has signed a three-year contract for standard needles at $50 a thousand, the seller agreeing to reduce the price if, in his discretion, conditions should warrant.

The contract, however, carries no positive assurance of supplies, as it contains the safety clause exempting the seller from liability should conditions beyond his control arise.

Several hosiery manufacturers complain of a handicap in their inability to procure looping machinery, and in at least two instances of this kind, shipments of looped toe goods have been suspended, the sewed toe being substituted where acceptable.

Adding to the perplexities of manufacturers in Philadelphia, the boarders are threatening a strike for higher wage schedules. Thus far the trouble has been confined chiefly to full-fashion mills in two of which the boarders walked out when their demand was refused. It is expected the seamless mills will be the next target for the union, and that any concessions to boarders will be followed by demands from loopers.

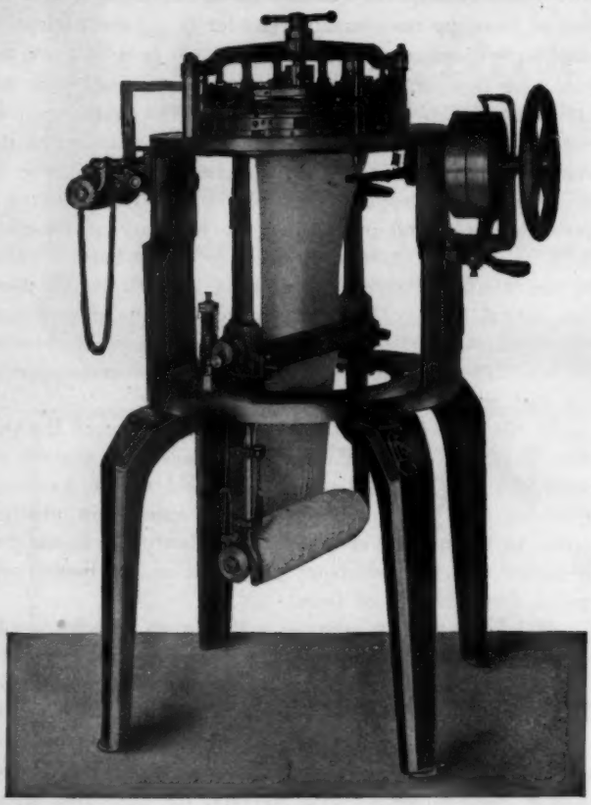
Most mills, as at present advised, are disposed to grant no radical advance, as it would add materially to the cost of spring merchandise, prices on which were named months ago.

In the main the boarders are satisfied and are reluctant to obey a strike order. But for a few union officials the trouble would disappear.

A Berks County, Pa., mill, in which all hands (non union) struck at the behest of a girl knitter, promptly notified all customers that a shut down had been forced by the strike and that therefore all orders were to be regarded as cancelled. When a week later the idle hands returned and asked to be reinstated the mill owner said he had no orders and would be in no hurry about resuming. He finally yielded to persistent appeals and started his mill under the former wage scale, refusing, however, to re-employ the knitter who had led the strike and who thus far has failed to connect with any other factory in the town.

So far as can be learned, hosiery manufacturers are no longer keen over South American business, after the jolt received a month ago when cancellations poured in from a large house in Buenos Aires. The buyer for this house in a scathing letter to a Pennsylvania mill, arraigns American manufacturers and condemns American hosiery. It develops that a lot of half hose which he referred to as of very inferior quality had not been shipped and therefore had been virtually rejected before he had seen it. In the letter the threat is made that after the war South American merchants will have no use for United States hosiery.

A hosiery mill in response to a request from a merchant in Montreal, Canada, for samples and prices, replied in



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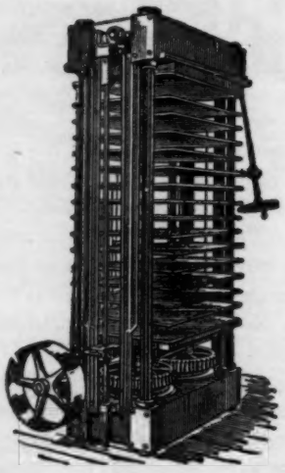

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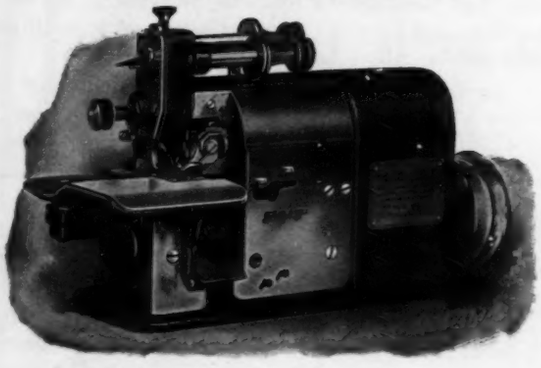

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effect that the mill could not entertain a proposition for any but domestic business, particularly in view of Great Britain's embargo on English needles and refusal to grant license for shipments from Rotterdam.

As a matter of fact, few mills are eager for export business except at fancy prices and from merchants with whom they have hopes of establishing permanent relations.

Both members of the firm of Ed A. Keller & Co., Manila, Philippine Islands, have been combing the northern markets and may have visited the south for the cheaper grades of hosiery and underwear. Mr. Keller says that when he sailed from Manila for this country, Japan was supplying underwear as low as 90 cents a dozen.

A central Pennsylvania manufacturer has advanced the price of his waste yarn 2-pound 84 needle half hose to 85 cents, for deliveries to February inclusive, order acceptances conditioned on the mill's ability to procure supplies.

Several manufacturers of the same line after going exhaustively into cost finding say they regard the price as inadequate.

Bleaching Cotton Hosiery.

EDITOR COTTON:

On page 42 of your November number is described a method of bleaching cotton hosiery. In this article it is stated "that the goods must then be thoroughly washed and then treated with a solution of chloride of lime at 1½ degrees twaddle." Afterward this article refers to the thorough washing and treatment or bath of sodium bisulphite.

Personally, I think that electrolytic sodium hypochlorite is better for bleaching purposes than calcium hypochlorite made from chloride of lime. Besides, after the thorough washing and rinsing there would be no necessity for the sodium bisulphite bath when using hypochlorite made by the electrolytic process, thus saving that expense, for the reason that there are no insoluble particles in the sodium hypochlorite when made electrolytically and it is all easily rinsed out.

I am forwarding this to you as a reminder for those knitters who may be at present using the old chloride of lime method or for the benefit of others who might possibly be misled by the brief paragraph which you printed in the November number.

Experienced Bleacher.

[Editor's note.—The following extracts are taken from an article by J. Merritt Matthews, Ph.D., which was published in COTTON in 1910, and in which the author goes somewhat fully into the question of electrolytic chlorine.]

It is the hypochlorite cell, however, which has special interest to the cotton bleacher; for its use as at present developed does not involve a large outlay of capital and expert labor, and when employed for the production of dilute solutions of sodium hypochlorite to be used directly in bleaching, its efficiency can be maintained so as to bring the cost of the bleaching down to a favorable comparison with chloride of lime.

Outside of the factor of cost, however, there are other considerations to be borne in mind when comparing the method of electrolytic bleaching with that in which chloride of lime is used. In the first place, chloride of lime is an obnoxious substance to handle. This is especially true in mills where only a moderate amount of bleaching is done, and which consequently cannot go to the expense and labor of handling the bleaching powder in the most scientific manner. There is great danger of "fly," or dust from the bleaching powder, when being mixed contaminating or destroying valuable products in the mill. The preparation of the bleaching solution requires a thorough agitation of the chemic with water, then prolonged settling and filtering in order to obtain properly clarified liquor. This requires a series of tanks and pumps and the necessity of handling large amounts of sludge. In order to obtain the full value of the chloride of lime it is necessary to leach out the powder several times. It is therefore easy to understand that the preparation of the bleach liquor in the case of chloride of lime must be taken into consideration when comparing the cost with that of the electrolytic liquor.

In the second place, the bleaching efficiency of the two solutions must be compared. A considerable amount of work, both of a theoretical and practical nature, has been done on this question. The general opinion in practice seems to be that the chloride in the electrolytic liquor has a higher bleaching efficiency than that in the liquor prepared from chloride of lime.

It is a matter of experience that when bleaching with chloride of lime there is always a stronger odor of chlorine gas evident, which shows that there must be a considerable loss of this agent, for all chlorine which escapes from the bleaching liquors or from the fabric when being bleached cannot effect any bleaching action and is a total loss. When using electrolytic bleaching liquors, on the other hand, there is no apparent odor of free chlorine either in the liquors themselves or in the fabric undergoing bleaching, hence it is an indication of very little loss of chlorine during the bleaching process. The bleaching action of electrolytic chlorine is also found to be much more rapid than that in chloride of lime liquors. This also tends to conserve the chlorine from loss, and hence gives it a higher efficiency in bleaching.

In the next place, we must consider the difference in the composition and properties of the solutions in the two cases. A bleaching liquor prepared from chloride of lime is a complicated solution, the exact constituents of which have never yet been satisfactorily determined. It is known, however, to contain a large proportion of calcium hydrate (caustic lime) and calcium chloride, the active chlorine probably existing in combination as calcium hypochlorite. The caustic lime makes the solution rather strongly alkaline, and unless care is exercised in the treatment of fabrics with chloride of lime solutions, spots will be formed consisting of oxycellulose resulting from the action of the caustic lime on the cotton fiber. This causes tendering and yellowing, and is a frequent defect in bleaching.

The electrolytic bleaching liquor contains common salt and sodium hypochlorite and is a neutral solution. The product of decomposition resulting from the action of the bleaching process is only common salt, so that in this solution there is nothing to act harmfully on the cotton fiber. This is however, supposing that the electrolysis has been conducted under the proper conditions, and these involve three factors, namely, current density, strength of brine solution and temperature. If these are not in proper adjustment there is danger of sodium chlorate being formed in conjunction with the hypochlorite, and this substance, if

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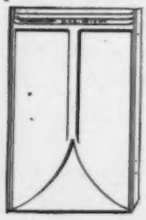

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accumulated in sufficient quantity, will act injuriously on the fiber.

The proper conditions of operating the cell, however, are now rather thoroughly understood, and under proper supervision there is not much danger of the formation of chlorates in any quantity sufficient to cause injury. We see then, that in electrolytic bleach liquors practically the only ingredient is eventually sodium chloride (common salt); or if sulphuric acid is employed in the souring of the bleached goods, sodium sulphate will also be present. Both of these substances, however, are neutral, and being highly soluble, are easily removed from the fiber by a slight washing. With the chloride of lime bleaching, however, when sulphuric acid is employed for souring, we have to consider as present the neutral though highly insoluble calcium sulphate and the rather corrosive though highly soluble calcium chloride. The caustic lime originally present during bleaching, of course, is also converted into sulphate by the souring process. The calcium chloride is easily removed by the washing but more or less of the calcium sulphate will remain in the goods, and if the souring is not sufficiently thorough there is a possibility of some caustic lime also remaining, a feature which is especially bad.

Owing to the action of the lime salts in the bleaching, and to the fact that more or less of these salts are left in the finished bleached goods, the bleaching with chloride of lime will give a somewhat harsher feel to the fabric than when electrolytic liquors are used. This seems at least, to be the general experience in practice. As a factor in this connection, we must also consider that the latter form of bleaching does not require as severe an acid treatment nor as prolonged a washing.

Among the Knitting Mills.

It is stated that a building has been secured and a knitting mill will be established by W. B. Davis at Gadsden, Ala. Mr. Davis at present operates knitting mills at Ft. Payne, Ala., and Attalla, Ala. It is reported that 100 machines will be installed.

The Merck-Hetrick Hosiery Mills at Gainesville, Ga., are installing 200 additional knitting machines and accompanying equipment. Incidentally, this mill is in the market for a good Acme machine fixer.

The Aycock Hosiery Mills at South Pittsburg, Tenn., are building additions to consist of five units each 50x84 feet and two stories high. 100 new knitting machines will be added to their equipment at present.

It is reported that a company is to be organized at Houston, Ala., to build and equip a hosiery mill to employ approximately 100 operatives.

The Blood Knitting Co., manufacturers of men's ribbed underwear, at Amsterdam, N. Y., is preparing to build an addition to its mills, to be devoted to the manufacture of cop yarn. The addition will be a reproduction of the last new mill of the company, and will adjoin it.

The Commonwealth Hosiery Mill, at High Point, N. C., will have a daily capacity of 650 dozen pairs of hose. A building has been rented and the machinery will be driven by electricity. The company was recently mentioned as chartered with $125,000 capital. It has organized with J. Elwood Cox, president; A. M. Briggs, vice-president; H. A. White, secretary-treasurer.

An increase of capital from $100,000 to $200,000 has been decided upon for the Magnet Knitting Mills Co., Clinton, Tenn.

The North Hudson Knitting Mills, Union, N. J., have been incorporated to manufacture and deal in hosiery, underwear, and textile goods, the capital stock being $10,000.

The Herbert Hosiery Mlil, Philadelphia, Pa., has been moved from Adams and Wingohocking streets, Frankford, to 2045 Trenton avenue, Kensington.

C. O. Kuester, Charlotte, N. C., will build a hosiery knitting mill, investing from $75,000 to $100,000. His plans contemplate a $12,000 one-story 200x50-foot brick mill constructed factory to be equipped with machinery for a daily capacity of 100 dozen pairs of whole and half hose. The equipment is to include 200 knitting machines and 20 five-horsepower electric motors.

A final decree has been issued by the District Court of the United States in the Eastern Judicial District of Missouri in favor of the Paramount Hosiery Form Drying Company versus the Chester Knitting Mills, defendant, ordering that a perpetual injunction be issued against the defendant as outlined in equity No. 4477 on Letters Patent No. 1,114,966.

The Lone Star Hosiery Mill Company, of Wichita Falls, Texas, has been organized with $10,000 capital. J. A. Avis is president.

The plant of the Standard Knitting Mill, Hamburg, Pa., which was destroyed by fire Nov. 7, at a loss of about $15,000, will probably be rebuilt. It is reported as likely that a temporary mill will be opened until such time as the new building is completed. The equipment of the mill consisted of 11 latch needle knitting machines and 16 sewing machines. Kessler & Mosser are the proprietors.

A report states that the plant of the Klison Hosiery Mill, Connelly Springs, N. C., recently organized with a capital of $75,000, will be equipped with 65 knitting machines. The daily capacity will be 250 dozen pairs of hose. F. Gavan is president of the company.

Dyestuffs from the Osage Orange.

The Year Book for 1915 of the U. S. Department of Agriculture describes the chemical composition of Osage orange wood as compared with fustic and says that a study of the extract obtained by leaching the ground wood or shavings of Osage orange with water showed the dyeing principles present to be Morin or Moric Acid, and Moritannic Acid or Maclurin, the same as those in Fustic, and a very small amount of a third, unknown red constituent. This red constituent is found in relatively large amounts in Fustic from some localities, for example Mexico, and in comparatively small amounts in material grown in Jamaica and South America. Its practical absence from Osage orange, however, is an advantage rather than a defect, since any considerable quantity of it tends to reduce the purity of the shades obtained and to give them a muddy or murky appearance.

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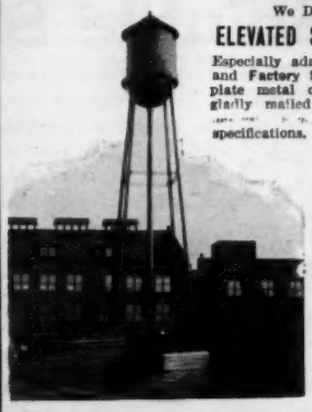

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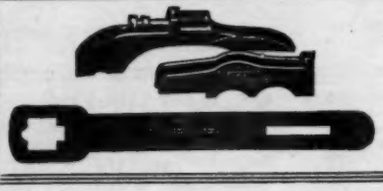

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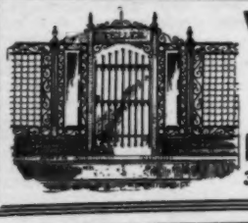

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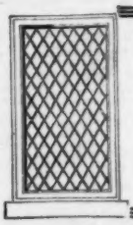

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Allis-Chalmers Mfg. Co.
Air Hose.
(See Hose—Air.)
Air Moistening Systems.
(See Humidifying Apparatus.)
Alkalies.
Baltic Chemical Co.
Brown & Bro., B.
Chemical Co. of America.
Cone, Frederick H.
Marden, Orth & Hastings Co.
Madero Bros.
Aniline Colors.
Baltic Chemical Co.
Bayer Co.
Bosson & Lane.
Chemical Co. of America.
Farbwerke-Hoechst Co.
Formen Trading Co.
Holland Aniline Co.
Klipstein & Co., A.
Madero Bros.
Marden, Orth & Hastings Co.
National Aniline & Chemical Co.
Standard Aniline Products Co.
Sykes & Co., Walter F.
Anti-Chlorine.
Baltic Chemical Co.
Bosson & Lane.
Brown & Bro., B.
Chemical Co. of America.
Cone, F. H.
Formen Trading Co.
National Aniline & Chemical Co.
Seydel Mfg. Co.
Aprons—Rub.
Graton & Knight Mfg. Co.
Smith & Furbush Machine Co.
Aprons—Rubber.
Goodrich Co., B. F.
Architects and Engineers.
Cramer, Stuart W.
Saco-Lowell Shops.
Sirrine, J. E.
Ash Handling Machinery.
Hunt Co., C. W.
Link-Belt Company.
Asphalt Slate Shingles.
General Roofing Mfg. Co.
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American Audit Co.
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Lewis-Hall Iron Wks.
Ball Bearings.
Chapman Mfg. Co.
S. K. F. Ball Bearing Co.
Transmission Ball Bearing Co., Inc.
Ball Bearing Spindles.
Chapman Mfg. Co.
Bale Band Buckles.
(See Buckles.)
Bale Ties.
Acme Steel Goods Co.
Signode System, Inc.
Baling Machines.
Crompton & Knowles Loom Wks.
Draper Co.
Economy Baler Co.
Saco-Lowell Shops.
Seeger-Walraven Co.
Baling Presses.
Butterworth & Sons Co., H. W.
Curtis & Marble Mch. Co.
Economy Baler Co.
Philadelphia Drying Mchy. Co.
Seeger-Walraven Co.
Smith & Furbush Mch. Co.
Banding.
American Textile Banding Co., Inc.
Keystone Fibre Co.
Leatheroid Mfg. Co.
Standard Fibre Co.
Seydel Mfg. Co.
Signode System, Inc.
Banding Machinery and Bandings.
Acme Steel Goods Co.
Cary Mfg. Co.
Draper Co.
Signode System, Inc.
Baskets—Fibre.
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Baskets—Waste.
Baylis Office Equip. Co.
Beam Dyeing Machine.
Columbus Truck & Supply Mfg. Co.
Beaming and Warping Mchry.
Columbus Truck & Supply Mfg. Co.
Crompton & Knowles Loom Wks.
Draper Co.
Saco-Lowell Shops.
Smith & Furbush Mach. Co.
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Textile Specialty Co.
Bearings.
Bound Brook Oil-less Bearing Co.
Hubbard Mch. Co.
S. K. F. Ball Bearing Co.
Textile Specialty Co.
West Point Iron Wks.
Beater Boxes—Ball Bearing.
Hubbard Mch. Co.
Belting, Leather.
American Supply Co.
Graton & Knight Mfg. Co.
Belting, Link.
Link-Belt Company.
Belting—Rubber.
Goodrich, Co., B. F.
Belt Cement.
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Goodrich Co., B. F.
Graton & Knight Mfg. Co.
Belt Conveyors.
Link-Belt Company.
Belt Dressing.
Jos. Dixon Crucible Co.
Graton & Knight Mfg. Co.
Harding, Inc., H. C.
Belt Lacing, Leather.
Graton & Knight Mfg. Co.
Belt Tighteners.
Hunter Mch. Co., Jas.
Link-Belt Company.
Bleaching.
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Bleaching Kiers.
Allen Sons Co., Wm.
Butterworth & Sons Co., H. W.
Philadelphia Drying Machy. Co.
Textile Finishing Machinery Co., The.
Worcester Steam Boiler Wks.
Bleaching Machinery.
American Laundry Machinery Co., The
Butterworth & Sons Co., H. W.
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Electro Chemical Co.
Franklin Process Co.
Philadelphia Drying Machy. Co.
Tolhurst Machine Works.
Smith, Drum & Co.
Bleaching Materials.
Baltic Chemical Co.
Bosson & Lane.
Brown & Bro., B.
Chemical Co. of America.
Cone, Frederick H.
Electro Bleaching Gas Co.
Electro Chemical Co.
Electric Smelting & Alum. Co.
Formen Trading Co.
Harding, Inc., H. C.
Leyland & Co., Thos.
Madero Bros.
Marden, Orth & Hastings Co.
Moore Oil Co.
National Aniline & Chemical Co.
Seydel Mfg. Co.
Southern Chemical Lab.
Wolf & Co., Jacques.
Blowers and Blower Systems.
General Electric Co.
Leigh & Butler.
New York Blower Co.
Philadelphia Drying Mach. Co.
Boards—Form.
Pearson, Jos. T.
Textile Finishing Mch Co.
Bobbins.
Draper Co.
Jordan Mfg. Co.
Leigh & Butler.
Shambow Shuttle Co.
Boilers.
Chattanooga Boiler & Tank Co.
Chicago Bridge & Iron Co.
Lombard Iron Works & Supply Co.
Schofield's Co., J. S.
Toomey, Frank.
Walsh & Weidner Boiler Co.
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Jos. Dixon Crucible Co.
Box Strapping.
Acme Steel Goods Co.
Cary Mfg. Co.
Signode System, Inc.
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Keystone Fibre Co.
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Standard Fibre Co.
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Chicago Bridge & Iron Co.
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Dufur & Co.
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Bound Brook Oil-less Bearing Co.
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Keystone Fibre Co.
Leatheroid Mfg. Co.
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Philadelphia Drying Machy. Co.
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Howard & Bullough.
Hubbard Machine Co.
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Smith & Furbush Mach. Co.
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Lehnert Textile Co.
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Howard & Bullough.
Leigh & Butler.
Saco-Lowell Shops.
Card Feeds.
Schofield, Wm. & Co.
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Leigh & Butler Co.
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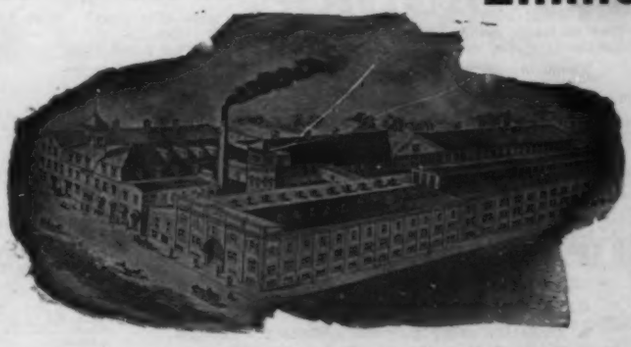

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Atlanta Stamp & Stencil Wks.
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Arabol Mfg. Co.
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National Aniline & Chemical Co.
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General Electric Co.
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Seeger-Walraven Co.

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Taylor Instrument Co.

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Excelsior Pulley C.
Hunt Co., C. W.
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Phila. Textile Machy. Co.
Saco-Lowell Shops.
Schofield, Wm. & Co.
Seeger-Walraven Co.
Smith & Furbush Mach. Co.

Cooling (Condensing Water).
Spray Eng. Co.

Copper Stamps and Stencils.
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Cordage Machinery.
Saco-Lowell Shops
Smith & Furbush Mach. Co.
Textile Finishing Machinery Co., The

Cork Insert Pulleys.
American Pulley Co.
Cork Insert Co.

Cotton—Absorbent.
Southern Aseptic Laboratories.

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Paulson, Linkroum & Co.
Salkeld & Bro., A. D.
Weimar Bros.
Woodward, Baldwin & Co.

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Beer, H. & B.

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Delahunty Dyeing Mach. Co.
Dixon Lubricating Saddle Co.
Draper Co.
Elliott & Hall.
Firsching, J. A.
Hubbard Mch. Co
Howard & Bullough.
Hunter Mch. Co., Jas.
Leigh & Butler.
Leyland & Co., Thos.
Phila. Drying Mchy. Co.
Phila. Textile Machy. Co.
Saco-Lowell Shops.
Sargent's Sons, Corp., C. G.
Schofield Co., Wm.
Seeger-Walraven Co.
Signode System, Inc.
Smith, Drum & Co.
Smith & Furbush Mach. Co.
Stafford Co., The
Textile Finishing Machinery Co., The.
Toomey, Frank.
West Point Iron Wks.
Whitinsville Spinning Ring Co.

Coupling—Bale Strapping.
Signode System, Inc.

Coupling—Rope.
Hunt Co., C. W.

Counting Machines (Revolution, Hank, Pick, etc.)
National Scale Co.
Root Co., C. J.
Veeder Mfg. Co.

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Link-Belt Company.

Crayons.
American Crayon Co
Dixon Crucible Co., Jos.

Crushing Machinery.
Allis-Chalmers Mfg. Co.

Cuspidors.
Baylis Office Equip. Co.
Wolfson Tray Co.

Cutters (Cloth).
(See Cloth Cutters.

Dies (Steel).
Dixie Seal & Stamp Co.

Disinfectants.
Barrett Co., The.

Dobby Chains.
Crompton & Knowles Loom Wks.

Doffing Boxes (Fibre).
(See Boxes—Fibre.)

Drawing Frames.
Howard & Bullough.
Saco-Lowell Shops.

Drills—Electric.
Westinghouse Elec. & Mfg. Co.

Drives for Cylinders.
Cohoes Iron Foundry & Mch. Co.

Drying Machinery.
Butterworth & Sons Co., H. W.
Hunter Mch. Co., Jas.
Philadelphia Drying Mach. Co.
Philadelphia Tetile Mchry Co.
Sargent's Sons Corp., C. G.
Textile Finishing Machinery Co., The

Dust Collectors.
New York Blower Co.
Phila. Drying Machy. Co.

Dusting Machinery.
Schofield, Wm. & Co.
Smith & Furbush Mach. Co.

Dyers, Bleachers and Finishers.
Aberfoyle Mfg. Co.
Franklin Process Co.

Dyeing, Bleaching and Finishing Machinery.
American Laundry Mchy. Co. The.
Butterworth & Sons, H. W.
Cohoes Foundry & Mch. Wks.
Columbus Truck & Supply Mfg. Co.
Curtis & Marble Mach. Co.
Delahunty Dyeing Machine Co.
Elliot & Hall.
Electro Bleaching Gas Co.
Electro Chemical Co.
Firsching, J. A.
Franklin Process Co.
Hunter Mch. Co., Jas.
Klipstein & Co., A.
Leigh & Butler.
Leyland & Co., Thos.
Phila. Drying Machy. Co.
Phila. Textile Machy. Co.
Reliance Machine Works.
Smith, Drum & Co.
Textile Finishing Machinery Co., The.
Tolhurst Machine Works.

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Phila. Drying Machy. Co.

Dyestuffs.
Aberfoyle Mfg. Co.
Baltic Chemical Co.
Bayer Co.
Bosson & Lane.
Brown & Bro., B.
Chemical Co. of America.
Cone, Frederick H.
Electric Smelting & Aluminum Co.
Electro Bleaching Gas Co.
Formen Trading Co.
Harding, Inc., H. C.
Holland Aniline Co.
Klipstein & Co., A.
Leyland & Co., Thos.
Lewis, John D.
Madero Bros.
Marden Orth & Hastings Co.
National Aniline & Chemical Co.
Seydel Mfg. Co.
Standard Aniline Products Co.
Southern Chemical Lab.
Sykes & Co., Walter F.
Wolf & Co., Jacques.

Dynamos and Motors.
(See Motors and Dynamos.)

Electric Light Plants (Small).
Fairbanks, Morse & Co.

Electrical Installations.
Fairbanks, Morse & Co.

Electrical Machinery and Supplies.
Allis-Chalmers Mfg. Co.
Fairbanks, Morse & Co.
General Electric Co.
Seeger-Walraven Co.
Stuart-Howland Co.
Walsh & Weidner Boiler Co.
Westinghouse Electric & Mfg. Co.

Elevators and Conveyors.
Cohoes Iron Foundry & Mch. Co.
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(See Architects.)

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Charlotte, 210 S. Tryon St. Montreal, 45 Alexander St.

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Seeger-Walraven Co.

Engines (Steam).
Allis-Chalmers Mfg. Co.
Lombard Iron Works & supply Co.
Schofield's Sons Co., J. S.
Seeger-Walraven Co.
Toomey, Frank.
Walsh & Weidner Boiler Co.

Extractors—Hydro.
American Laundry Mchy. Co. The
Tolhurst Machine Works

Fans—Power and Exhaust.
Fairbanks, Morse & Co.
General Electric Co.
Howard & Morse.
New York Blower Co.
Phila. Drying Machy. Co.
Crompton & Knowles Loom Wks.
Phila. Textile Machy. Co.
Tolhurst Machine Works.
Westinghouse Electric & Mfg. Co.

Felting Machinery.
Smith & Furbush Mach. Co.

Fence (Steel).
Cyclone Fence Co.
Stewart Iron Works.

Filing Cabinets & Systems.
Baylis Office Equip. Co.

Finishing.
(See Dyers, Bleachers and Finishers.)

Finishing Material.
American Soap & Washoline Co.
Baltic Chemical Co.
Brown & Bro., B.
Chemical Co. of America.
Cone, F. H.
Electro Bleaching Gas Co.
Harding, Inc., H. C.
Leyland & Co., Thos.
Madevo Bros.
Marden, Orth & Hastings.
Moore Oil Co.
Southern Chemical Lab.
Standard Aniline Products Co.
Wolf & Co., Jacques.

Fire Extinguishers.
Missouri Lamp & Mfg. Co.
Pyrene Mfg. Co.

Fire Hose.
(See Hose—Fire.)

Fire Protecting Paint.
(See Paint—Fireproof.)

Fluted Rolls.
Howard & Bullough.
Saco-Lowell Shops.
Schofield & Co., Wm.
Smith & Furbush Mach. Co.

Flyers.
Howard & Bullough.
Leigh & Butler.
Saco-Lowell Shops.

Folding Machines.
Curtis & Marble Co.
Elliot & Hall.

Fulling Mills for Woolen Goods.
American Laundry Machinery Co., The
Hunter Mch. Co., Jas.

Furniture—Office.
Baylis Office Equip. Co.

Fuses.
Economy Fuse & Mfg. Co.
General Electric Co.

Garnett Machines.
Hunter Mch. Co., Jas.
Leigh & Butler.
Smith & Furbush Machine Co.

Gas Engines.
(See Engines—Gas.)

Gaskets—Fibre.
Diamond State Fibre Co.

Gaskets—Rubber.
Goodrich Co., B. F.

Gears (Silent).
Diamond State Fibre Co.
General Electric Co.

Glass (Wire).
Mississippi Wire Glass Co.

Glue—Iron.
Ament, H. B.

Glycerine.
Harding, Inc., H. C.

Grain Bags.
American Supply Co.

Grease.
(See Lubricants.)

Guards for Machinery.
Consolidated Expanded Metal Companies

Gummed Tape and Moistening Machine for Slashers.
Papco Paper Products Co.

Gums.
Klipstein & Co.
Leyland & Co., Thos.

Hangers.
West Point Iron Wks.

Harness—Loom.
American Supply Co.
Crompton & Knowles Loom Wks.
Emmons Loom Harness Co.
Garland Mfg. Co.

Heating and Ventilating Apparatus
(See Ventilating Appartus.)

Heddles.
Crompton & Knowles Loom Kks.
Draper Co.

Heddle Frames.
Crompton & Knowles Loom Wks.

Hoists (Electric).
Fairbanks, Morse & Co.
Link-Belt Company.
Seeger-Walraven Co.

Hose—Air.
Goodrich Co., B. F.

Hose (Fire).
Goodrich Co., B. F.

Hose—Steam.
Goodrich Co., B. F.

Hose—Water.
Goodrich Co., B. F.

Hosiery Finishing Boards.
(See Boards.)

Hospital Equipment.
Betz, Frank S.
Southern Aseptic Laboratories.
White Chemical Co.

Hotels.
Lenox.
Marlborough.
Marseilles.
Martinique.
St. Charles.
Tuller.

Humidifying Apparatus.
Cramer, Stuart W.
Spray Eng. Co.

Hydraulic Turbines.
(See Turbines Steam.)

Hydro Extractors.
(See Extractors.)

Indicating and Recording Instruments.
Taylor Instrument Co.

Ink (Stencil).
Atlanta Stamp & Stencil Wks.
Bradley Mfg. Co., A. J.
Dixie Seal & Stamp Co.

Ink—Writing.
Baylis Office Equip. Co.

Iron Work—Ornamental.
Chattanooga Iron Works.
Chicago Bridge & Iron Wks.
Cyclone Fence Co.
Dufur & Co.

Jacquards.
Crompton & Knowles Loom Wks.

Jute Bagging Machines.
Smith & Furbush Mach. Co.

Kiers.
(See Bleaching Kiers.)

Knit Goods Washers.
(See Washers—Cloth.)

Knitting Machinery.
Boss Knitting Mach. Works.
Brinton Co., H.
Hemphill Mfg. Co.
Nye & Tredick Co.
Scott & Williams.
Stafford & Holt
Smith & Furbush Mach. Co.
Wildman Mfg. Co.

Lace Leather.
Graton & Knight Mfg. Co.

Lamps—Incandescent and Arc.
Boston Economy Lamp Division.
Edison Lamp Works.
General Electric Co.
Stuart-Howland Co.
Westinghouse Electric & Mfg. Co.
Westinghouse Lamp Co.

Lappers.
Saco-Lowell Shops.
Smith & Furbush Mach. Co.

Laundry Machinery.
American Laundry Mchy. Co. The
Tolhurst Machine Works.

Leather Belting.
(See Belting—Leather.)

Linen Yarns.
(See Yarns—Linen.)

Link Belting.
(See Belting—Link.)

Liquid Chlorine.
(See Chlorine.)

Loaders (Wagon and Truck).
Link-Belt Company.

Looms.
Crompton & Knowles Loom Wks.
Draper Co.
Saco-Lowell Shops.
Schofield, Wm. & Co.
Stafford Co., The

Loom Harness Straps.
Graton & Knight Mfg. Co.

Lubricants.
Dixon, Jos., Crucible Co.
Floto Mica Sales Co.
Harding, Inc., H. C.
Kellogg & Co., E. H.
Moore Oil Co.
N. Y. & N. J. Lubricant Co.

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Makes the Strongest, Smoothest Warps; the Best Cloth and Least Seconds.

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BUYERS' INDEX—Continued.

Lug Straps.
(See Straps—Luggage.)
Lumber.
Salkeld, A. D. & Bro.
Marking Pots, Stencils, Ink, Etc.
Atlanta Stamp & Stencil Wks.
Bradley Mfg. Co.
Dixie Seal & Stamp Co.
Measuring Machine.
Elliot & Hall.
Mercerized Yarns.
(See Yarns Mercerized.)
Mercerizers.
Aberfoyle Mfg. Co.
Mercerizing Machinery.
Butterworth, H. W. & Sons Co.
Smith, Drum & Co.
Textile Finishing Machinery Co.
Wolf & Co., Jacques.
Medical Room Furniture & Supplies.
Betz Co., Frank S.
Metal Lath & Reinforcing (Expanded).
Consolidated Expanded Metal Companies.
Meters—Revolution, Etc.
Veeder Mfg. Co.
Root Co., C. J.
Meters (Flow, Air, Gas, Steam).
General Electric Co.
Westinghouse Elec. & Mfg. Co.
Mill Baskets and Boxes.
(See Boxes—Fibre.)
Mill White Paint.
(See Paint—Mill White.)
Millwrights.
Hunter Mch. Co., Jas.
Motors & Dynamos.
Allis-Chalmers Mfg. Co.
Fairbanks, Morse & Co.
General Electric Co
Seeger-Walraven Co.
Westinghouse Elec. & Mfg. Co.
Mule Stands.
Transmission Ball Bearing Co.
Napping Machinery.
Curtis & Marble Mch. Co.
Leigh & Butler.
Nigrum.
Bound Brook Oil-less Bearing Co.
Non-Fluid Oils.
N. Y. & N. J. Lubricant Co.
Office Supplies, Furniture, Etc.
Baylis Office Equip. Co.
Oils.
Baltic Chemical Co.
Brown & Bro., B.
Chemical Co. of America.
Cone, Frederick H.
Harding, Inc., H. C.
Leyland & Co., Thos.
Madero Bros.
Marden, Orth & Hastings Co.
Moore Oil Co.
Seydel Mfg. Co.
Wolf & Co., Jacques.
Oils—Non-Fluid.
N. Y. & N. J. Lubricant Co.
Openers for Cotton, Wool, Waste Etc.
Leigh & Butler.
Saco-Lowell Shops.
Schofield Co., Wm.
Smith & Furbush Mach. Co.
Oxidizing Machinery.
Phila. Drying Machinery Co.
Oxygen.
Bird Wilcox Co.
Prest-O-Lite Co.
Packings—Leather.
Graton & Knight Mfg. Co.
Packings—Rubber.
Goodrich Co., B. F.
Paint.
Barrett Co., The.
Chaffee, Thos. K.
General Roofing Mfg. Co.
Ullman-Philpott Co
Wadsworth-Howland & Co., Inc.
Wolf Paint Co., Leon L.
Paint—Fireproof.
General Roofing Mfg. Co.
Wadsworth-Howland & Co., Inc.
Wolf Paint Co., Leon L.
Paint—Mill White.
Chaffee, Thos. K.
Ullman-Philpott Co.
Wadsworth-Howland & Co., Inc.
Wolf Paint Co., Leon L.
Perforated Metal.
Allis-Chalmers Mfg. Co.
Erdle Perforating Co.
Picking Machinery.
Curtis & Marble Mach. Co.
Howard & Bullough, Am Machine Co.
Saco-Lowell Shops.
Schofield Co., Wm.
Smith & Furbush Mach. Co
Pickers—Curled Hair.
Curtis & Marble Machine Co.
Schofield, Wm. & Co.
Smith & Furbush Mach Co.
Picker Housings.
Hubbard Mch. Co.
Pickers—Leather.
Garland Mfg. Co.
Graton & Knight Mfg. Co.
Picker Sticks.
Garland Mfg. Co.
Pipe Threading & Cutting Machines
Oster Mfg. Co.
Seeger-Walraven Co.
Power Companies.
(See Central Stations.)
Power Plants (Contractors).
Fairbanks, Morse & Co.
Power Transmission Machinery.
Allis-Chalmers Mfg. Co.
American Pulley Co.
Bound Brook Oil-less Bearing Co.
Cork Insert Co.
Excelsior Pulley Co.
Fairbanks, Morse & Co.
General Electric Co
Graton & Knight Mfg Co.
Goodrich Co., B. F.
Hunter Machine Co., Jas.
Link-Belt Company.
Seeger-Walraven Co.
S. K. F. Ball Bearing Co.
Textile Specialty Co.
Transmission Ball Bearing Co.
Westinghouse Electric & Mfg. Co.
West Point Iron Works.
Press Papers.
Diamond State Fibre Co.
Phila. Drying Machinery Co.
Press Rolls.
Cohoes Iron Foundry & Mch. Co.
Presses.
American Laundry Mchy. Co. The
Butterworth & Sons Co., H. W.
Curtis & Marble Mch. Co.
Economy Baler Co.
Phila. Drying Machinery Co.
Reliance Machine Works.
Seeger-Walraven Co.
Smith, Drum & Co.
Smith & Furbrush Mch. Co.
Textile Finishing Machinery Co., The.
Pulleys.
American Pulley Co.
Cork Insert Co.
Excelsior Pulley Co.
Link-Belt Company.
Seeger-Walraven Co.
Transmission Ball Bearing Co.
West Point Iron Works.
Pulley Crowning Glue.
Ament, H. H.
Pumps.
Allis-Chalmers Mfg. Co.
Cohoes Iron Foundry & Mch. Co.
Fairbanks, Morse & Co.
Seeger-Walraven Co.
Textile Finishing Machinery Co., The.
Toomey, Frank.
Walsh & Weidner Boiler Co.
Railings.
Chattanooga Iron Works.
Dufur & Co.
Railways—Industrial.
Hunt Co., C. W.
Railways.
Southern Railway.
Recording Instruments.
Taylor Instrument Co.
Reeds.
American Supply Co.
Emmons Loom Harness Co.
Reels.
Crompton & Knowles Loom Wks.
Draper Co.
Saco-Lowell Shops.
Schofield Co., Wm.
Repairing (Textile of all kinds).
Greenville Iron Works.
Hubbard Mch. Co.
Respirators—Automatic.
Barnard Mchry. Co.
Rewinding Machines.
Curtis & Marble Machine Co.
Rib Top Cutters.
Wildman Mfg. Co.
Ring Travelers—Steel and Bronze
Union Mfg. Co.
Whitinsville Spinning Ring Co.
Rocker Shaft Bearings.
Textile Spec. Co.
S. K. F. Ball Bearings Co.
Roller Covering.
Goodrich Co., B. F.
Graton & Knight Mfg. Co.
Roofing.
Barrett Co., The.
Cortright Metal Roofing Co.
General Roofing Mfg. Co.
Roof and Cement Coating.
General Roofing Mfg. Co.
Wadsworth, Howland & Co., Inc.
Rope—Transmission.
Hunt Co., C. W., Inc.
Hunter Mch. Co., Jas.
Link-Belt Company.
Roving Cans & Trucks.
(See Cans—Roving.)
Roving Machinery.
Howard & Bullough.
Saco-Lowell Shops.
Rubber Products.
Goodrich Co., B. F.
Rubber Stamps.
Atlanta Stamp & Stencil Co
Dixie Seal & Stamp Co
Saddles and Stirrups.
Dixon Lub. Saddle Co.
Sanitary Toilets.
(See Toilets.)
Saddles—Oil-less.
Bound Brook Oil-less Bearing Co.
Scales—Automatic.
American Kron Scale Co.
Screens & Sieves (Perforated)
Erdle Perforating Co.
Link-Belt Company.
Screws (Safety Set).
Allen Mfg. Co.
Scutchers.
Leyland & Co., Thos.
Second Hand Machinery.
Seeger-Walraven Co.
Toomey, Frank.
Sewing Machines.
Curtis & Marble Mach. Co.
Leyland & Co., Thos.
Merrow Machine Co., The.
Textile Finishing Mchy. Co.
Shaftings & Hangers.
S. K. F. Ball Bearing Co.
Seeger-Walraven Co.
Transmission Ball Bearing Co.
West Point Iron Wks.
Shafting Rings.
Graton & Knight Mfg. Co.
Shelving—Sectional Steel.
National Scale Co.
Shingles—Asphalt.
General Roofing Mfg. Co.
Shingles—Metal.
Cortright Metal Roofing Co.
Shift Plates for changing over Rings.
Union Mfg. Co.
Shipping Room Supplies.
Acme Steel Goods Co.
Baylis Office Equip. Co.
American Kron Scale Co.
Atlanta Stamp & Stencil Works.
Cary Mfg. Co.
Dixie Seal & Stamp Co.
Signode System, Inc.
Shuttles.
Crompton & Knowles Loom Wks.
Draper Co.
Shambow Shuttle Co.
Singeing Machinery.
Butterworth & Sons Co., H. W.
Curtis & Marble Machine Co.
Phila. Drying Machinery Co.
Smith, Drum & Co.
Textile Finishing Machinery Co., The.
Size Kettles.
Allen Sons Co., Wm.
Butterworth, H. W. & Sons Co.
Cohoes Iron Foundry & Mch. Co.
Howard & Bullough, American Machine Co.
Saco-Lowell Shops.
Textile Finishing Machinery Co., The.
Worcester Steam Boiler Wks.
Size Pumps.
Cohoes Iron Foundry & Mch. Co.
Sizing and Finishing Compounds.
Aberfoyle Mfg. Co.
American Soap & Washoline Co.
Baltic Chemical Co.
Bosson & Lane
Brown & Bro., B.
Chemical Co. of America.
Cone, Frederick H.
Corn Products Refining Co.
Electro Bleaching Gas Co.
Formen Trading Co.
Harding, Inc., H C.
Leyland & Co., Thos.
Madero Bros.
Moore Oil Co.
National Aniline Products Co.
Southern Chemical Lab.
Size System.
Keever Starch Co.
Seydel Mfg. Co.
Wolf & Co., Jacques.
Skewers.
Jordan Mfg. Co.

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BUYERS' INDEX—Continued.

Slashers.
Butterworth & Sons Co., H. W.
Cohoes Iron Foundry & Mch. Co.
Howard & Bullough.
Saco-Lowell Shops.
Textile Finishing Machinery Co., The.

Slasher Frictions.
Cohoes Iron Foundry & Mch. Co.

Slasher Tape—Gunmed.
Papco Paper Products Co.

Slate Asphalt Roofing.
General Roofing Co.

Slubbers.
Howard & Bullough.
Saco-Lowell Shops.

Soaps.
American Soap & Washoline Co.
Baltic Chemical Co.
Brown & Bro., B.
Chemical Co. of America.
Electric Smelting & Aluminum Co.
Harding, Inc., H. C.
Leyland & Co., Thos.
Madero Bros.
Marden, Orth & Hastings Co.

Soda (Textile).
Baltic Chemical Co.
Brown & Bro., B.
Chemical Co. of America.
Cone, Frederick H.
Leyland & Co., Thos.
Madero Bros.

Softeners—Cotton.
American Soap & Washoline Co
Aberfoyle Mfg. Co.
Arabol Mfg. Co.
Baltic Chemical Co
Bosson & Lane
Brown & Bro., B.
Chemical Co. of America.
Harding, Inc., H. C.
Leyland & Co., Thos.
Madero Bros.
Marden, Orth & Hastings.
Moore Oil Co.
Seydel Mfg. Co.
Southern Chemical Lab.
Wolf & Co., Jacques.

Softeners—Water.
(See Water Softeners.)

Spindles.
Draper Company.
Saco-Lowell Shops.

Spindles—Ball Bearing.
Chapman Mfg. Co.
Draper Company.
Howard & Bullough.
Saco-Lowell Shops.
Smith & Furbush Machine Co.

Spinning Rings.
Draper Company.
Howard & Bullough.
Union Mfg. Co.
Whitinsville Spinning Ring Co.

Spinning Tape Specialists.
American Textile Banding Co., Inc.
Barber Mfg. Co.

Spooling Machinery.
Draper Company.
Saco-Lowell Shops.
Smith & Furbush Mach. Co.

Spot Remover—Cotton.
Southern Chemical Laboratory.

Spray Water Cooling System.
Spray Eng. Co.

Sprinkler Tanks.
Chattanooga Boiler & Tank Wks.
Chicago Bridge & Iron Wks.
Walsh & Weidner Boiler Co.
Lombard Iron Works.

Sprocket Wheels.
Link-Belt Company.

Stamps and Stencils (Copper).
Dixie Seal & Stamp Co.

Stand Pipes.
Chattanooga Boiler & Tank Co.
Chicago Bridge & Iron Works.
Lombard Iron Works.
Walsh & Weidner Boiler Co.

Starch.
Corn Products Refining Co.
Keever Starch Co.
Leyland & Co., Thos.

Steam Engines.
(See Engines—Steam.)

Steam Hose.
(See Hose—Steam.)

Steam Pumps.
(See Pumps—Steam.)

Steam Traps.
(See Traps—Steam.)

Stencils and Stencil Machines.
Atlanta Stamp & Stencil Works.
Bradley Mfg. Co., A. J.
Dixie Seal & Stamp Co.

Stop Motion.
Crompton & Knowles Loom Wks.
Draper Company.
Wildman Mfg. Co.

Storage Warehouses for Cotton.
(See Warehouses.)

Straps—(Lug).
Goodrich Co., B. F.
Graton & Knight Mfg. Co.

Sweeps—Floor.
D. D. Felton Brush Co.

Tachometers.
Veeder Mfg. Co.

Tanks, Towers and Tubs.
Allen Sons Co., Wm.
Chattanooga Boiler & Tank Co.
Chicago Bridge & Iron Works.
Lombard Iron Works and Supply Co.
Phila. Drying Machinery Co.
Textile Finishing Machinery Co., The.

Tape and Tape Moistening Machine for Slashers.
Papco Paper Products Co.

Tapes and Braids.
American Textile Banding Co., Inc.
Weimar Brothers.

Temples.
Draper Company.

Tenters.
Butterworth & Sons Co., The.
Textile Finishing Mach. Co

Thermometers (Wet and Dry Bulb)
The Foxboro Company
Taylor Instrument Co.

Thin-Place Preventers.
Draper Company.

Thread Guides.
Leyland & Co., Thos.
Palmer Co., The I. E.

Toilets.
Cement Products Co.
Vogel Co., Jos. A.

Transmision (Power).
(See Power Transmission Machinery.)

Traps (Return Steam).
Morehead Mfg. Co.

Travelers—Floating.
Union Mfg. Co.

Trucks—Auto.
Lewis-Hall Iron Works.

Trucks—Elevating.
National Scale Co.

Trucks—Mill.
Columbus Truck & Supply Mfg. Co.
Diamond State Fibre Co.
Fibre Specialty Co.
Hunt Co., C. W.
Keystone Fibre Co.
Leatheroid Mfg. Co.
Standard Fibre Co.
Transmission Ball Bearing Co., Inc.

Tubes—Cloth Protecting.
Southern Novelty Co.

Turbines (Steam).
Allis-Chalmers Mfg. Co.
Fairbanks, Morse & Co.
General Electric Co.
Seeger-Walraven Co.
Westinghouse Elect. & Mfg. Co.

Twisting Machinery.
Draper Company.
Howard & Bullough, American Machine Co.
Leigh & Butler.
Saco-Lowell Shops.
Smith & Furbush Mach. Co.

Valves—Rubber.
Goodrich Co., B. F.

Valves—Steam, Ammonia, Water, Etc.
Foster Engineering Co.
Seeger-Walraven Co.

Toomey, Frank.

Varnishes.
Ullman-Philpott Co.
Wadsworth, Howland & Co.
Wolf Paint Co., Leon L.

Ventilating Apparatus.
Cramer, Stuart W.
General Electric Co.
Howard & Morse.
New York Blower Co.
Sargent's Sons Co., C. G.
Tolhurst Mch. Co.

Warehouses (Cotton Storage).
American Dock Co.

Warehouse Cars.
(See Trucks—Mill.)

Warp Tying Machines.
Barber-Colman Co.

Warpers and Warping Machinery.
Crompton & Knowles Loom Wks.
Draper Company.
Howard & Bullough,
Saco-Lowell Shops.
Smith & Furbush Mach. Co.

Washers (Cloth).
American Laundry Machinery Co. The
Butterworth, H. W. & Sons Co.
Hunter Mch. Co., Jas.
Philadelphia Drying Mchy. Co.
Phila. Textile Mchry Co.
Textile Finishing Mchry. Co.

Washers, Graphite and Bronze.
Bound Brook Oil-less Bearing Co.

Washers, Leather.
Graton & Knight Mfg. Co.

Washers—Rubber.
Goodrich Co., B. F.

Washers, Wooden, Oil-less.
Bound Brook Oil-less Bearing Co.

Waste Machinery (Cotton).
Howard & Bullough.
Leigh & Butler.
Saco-Lowell Shops.
Sargent's Sons Co., C. G.
Schofield Co., Wm.
Smith & Furbush Mach. Co.

Water Closets—Sanitary.
(See Toilets.)

Water Cooling Ponds.
(See Cooling.)

Water Hose.
(See Hose—Water.)

Water Softeners.
Chicago Bridge & Iron Wks.

Waterproofing Machinery.
Butterworth, H. W. & Sons Co.
Textile Finishing Machinery Co., The.

Weaving.
Aberfoyle Mfg. Co.

Weighing Apparatus.
(See Scales.)

Welding Apparatus.
Bird-Wilcox Co., Inc.
Prest-O-Lite Co.

Welding—Job.
Bird-Wilcox Co., Inc.

Wheels—Fibre.
Diamond States Fibre Co.
Fibre Specialty Co.
Keystone Fibre Co.
Leatheroid Mfg. Co.
Standard Fibre Co.

White Way Posts.
Greenville Iron Works.

Winding.
Aberfoyle Mfg. Co.

Winders.
Crompton & Knowles Loom Wks.
Curtis & Marble Machine Co.
Elliot & Hall.
Firsching, J. A.
Foster Machine Co.
Howard & Bullough, American Machine Co.
Leigh & Butler.
Saco-Lowell Shops.
Smith & Furbush Mach. Co.
Stafford Co., The

Windows—Wire
Chattanooga Iron Works.

Wire Glass.
(See Glass—Wire.)

Wood Preserver.
General Roofing Mfg. Co.
Lyster Chemical Co.
Wadsworth, Howland & Co.
Wolf Paint Co., Leon L.

Wood Pulleys.
Excelsior Pulley Co.

Woolen Machinery.
Butterworth, H. W. & Sons Co.
Crompton & Knowles Loom Wks.
Curtis & Marble Machine Co.
Draper Company.
Hunter Mch. Co., Jas.
Leigh & Butler.
Schofield Co., Wm.
Phila. Drying Machinery Co.
Phila. Textile Machinery Co.
Sargent's Sons Corp., C. G.
Stafford Co., The
Smith & Furbush Mach. Co.
Textile Finishing Machinery Co., The.

Yarns.
Aberfoyle Mfg. Co.
Hughes Fawcett.
Paulson, Linkroum & Co.

Yarns—Linen.
Hughes Fawcett.

Yarns (Mercerized).
Aberfoyle Mfg. Co.

Yarns—Turkey Red.
Hughes Fawcett.

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United States Census figures show that since 1880 the consumption of cotton in mills of the cotton growing states has increased 1,502 per cent, as compared with an increase of only 93 per cent in all other states. In the twelve months ended August 31, 1915, Southern mills consumed 385,856 more bales of cotton than the mills of all other states. Three-fourths, or 9,000,000, of the total cotton spindles in the cotton growing States are tributary to Southern Railway tracks. Of the 200 knitting mills in the South over 125 are located along the Southern Railway. Nearly all the Southern woolen and silk mills are also on Southern Railway tracks.

There is a reason for this, and it is not difficult to understand.

The Southern Railway Lines enter and serve most completely those portions of the South where the textile industry is the greatest success, because there are found all the conditions which make for successful manufacture—the proper transportation facilities, the ease with which the raw materials and the needed fuel may be secured, the supply of good labor, the pure water, the low cost of power, and favorable local conditions.

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If you have a plant to locate let us take up with you the question of the proper location. Your plans will be held confidential. Our knowledge of conditions at various points and our experience in locating other mills and the time of our agents in making special investigations are at your service, if desired.

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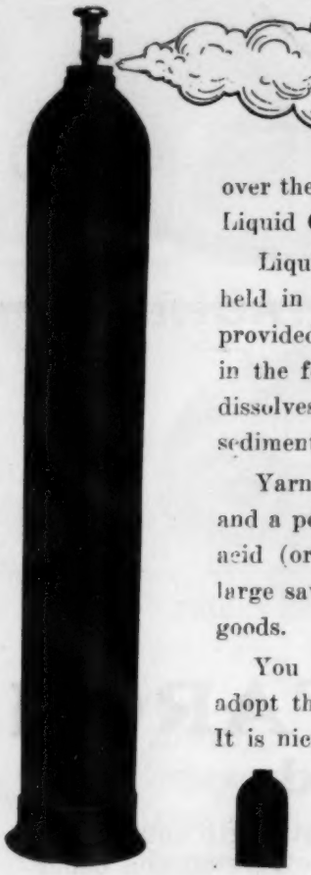
1 Pound of Liquid Chlorine = 6 Pounds of Bleaching Powder

That is why Liquid Chlorine is the 100% bleaching agent. Not only do the best bleaching powders contain only 36% available chlorine, but think of the waste in both powder and time, and also the freight charges you have to pay on the extra weight of drums and casks of bleaching powder. Every manufacturer is on the alert for an increase in efficiency. No workman can be efficient if exposed to the noxious effects of Bleach. In fact in many cases extra pay is required to secure men to mix it. Liquid Chlorine has no such disadvantages and when handled in the proper way does not even emit an odor. The advantages of



Cylinder with Cap Off
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Liquid Chlorine

over the old method of bleaching are so many that the mills that have adopted Liquid Chlorine would be loath to return to the old method.

Liquid Chlorine comes in steel cylinders containing 100 lbs. of chlorine held in liquid form in the cylinder by means of pressure. The cylinder is provided with a valve which on being opened allows the chlorine to escape in the form of gas. This gas is conducted by a pipe into a solution and it dissolves completely into a clear 100% bleaching agent that contains no sediment or sludge.

Yarns and cloth bleached with Liquid Chlorine have a much softer feel and a positive increase in the tensile strength of the goods is obtained. Less acid (or sour) is required which eliminates tendering and also results in a large saving in the amount of wash required, and no odor is apparent in the goods.

You need no material changes in your present method of bleaching to adopt the Liquid Chlorine method. It is far simpler and easier to handle. It is nicer, cleaner, more efficient and scientific method.

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Drop us a line asking for interesting booklet—TODAY.

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Make Your Bleach Out of Salt Water

WE manufacture a number of different types of cells for this purpose. All you require besides this is direct current of electricity and salt water.

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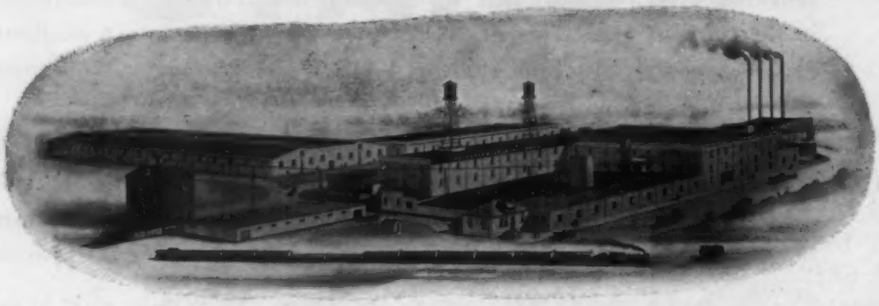

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It boils thin—penetrates the warps—increases breaking strength and carries the weight into the cloth. Being thoroughly washed free of gluten and other foreign matter it gives a bleach and finish to the goods that you can get from no other starch.

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The design of this machine reduces to the minimum, vibration—one of the most destructive influences that can affect mill machinery, and especially serious for a high speed machine like an extractor.

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Dyeing Machine

Columbus Truck & Supply Mfg. Co.

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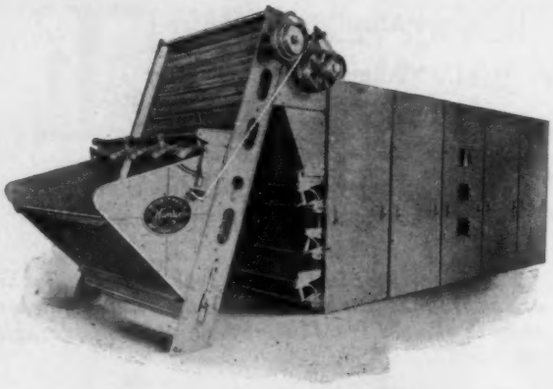

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Sizes from 12" to 72"

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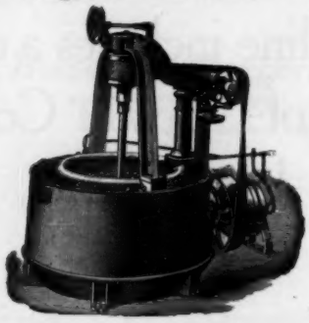

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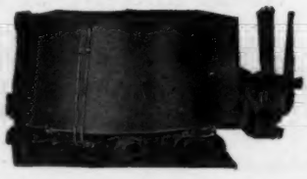
Oven Driven Extractor

Belt Engine or Motor Driven



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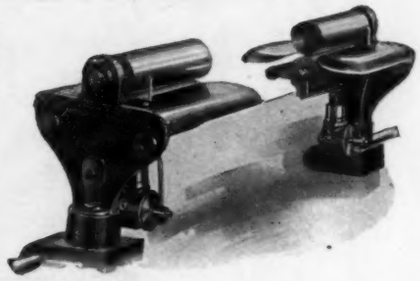

A man is not required to feed the fabric with the Foxwell guider attached to a machine. This mechanical feeder not only saves its cost in labor, but economizes floor space and increases production. Its use improves the finish of the goods.

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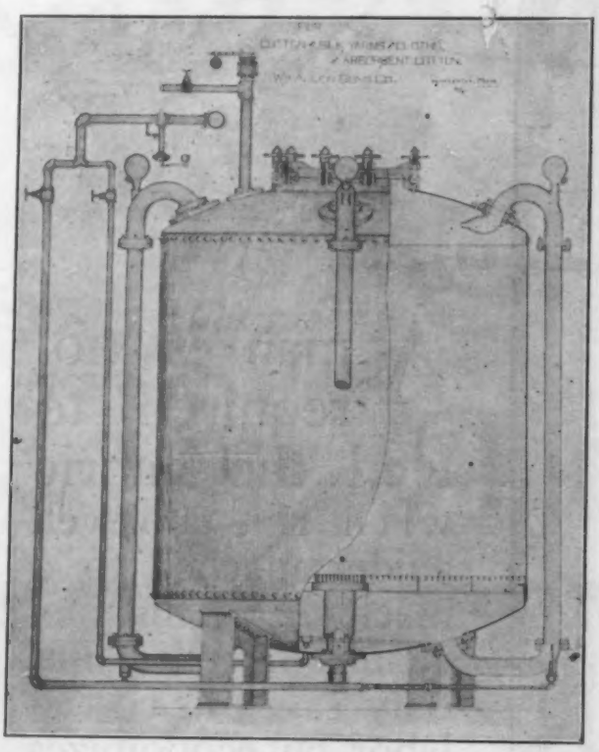

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"Allen Hydraulic" Kier
For Raw Stock. Unloaded in 30 minutes.

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"We note that in the new type kiers the liquor can be brought to a boiling point very much quicker than in the old type, thereby saving considerable time in the boil-off."

This new kier is mechanically correct, no live steam is admitted to the kier.

Absolutely uniform results are secured with less consumption of steam.

Let us show you how you can improve on your present system. Write us.

Logwood Extractor for Extracting the Coloring Matter from Logwood Chips.

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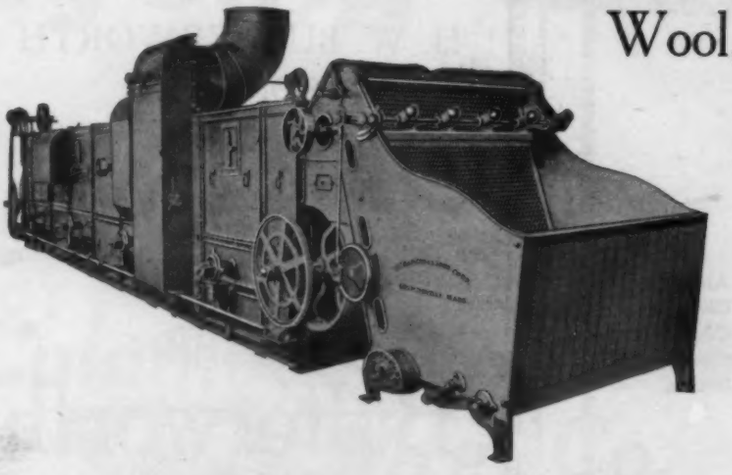

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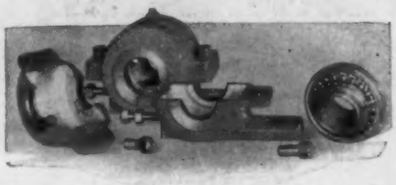
SKF BALL BEARINGS



SKF BALL BEARINGS

Card Cylinder Box (left) Doffer Cylinder Box (right) equipped with S. K. F. Ball Bearings.

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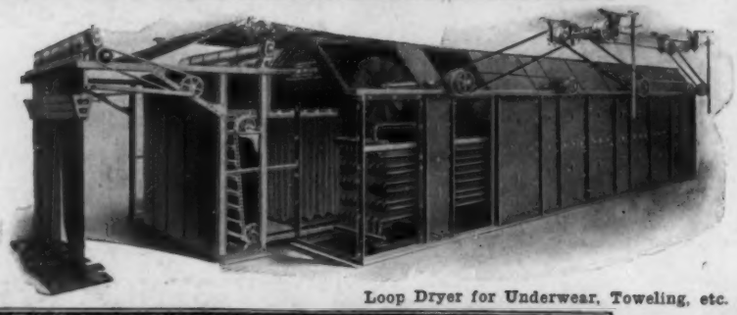

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